The PHOTOFACT® Servicer

SET 541 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ AUG. 1961

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MAGNAVOX CHASSIS 54—05—00

WEBCOR MODELS BP1812, GP1812, RP1812, TP1812

BONUS IN THIS SET

FOR STANDING ORDER SUBSCRIBERS!

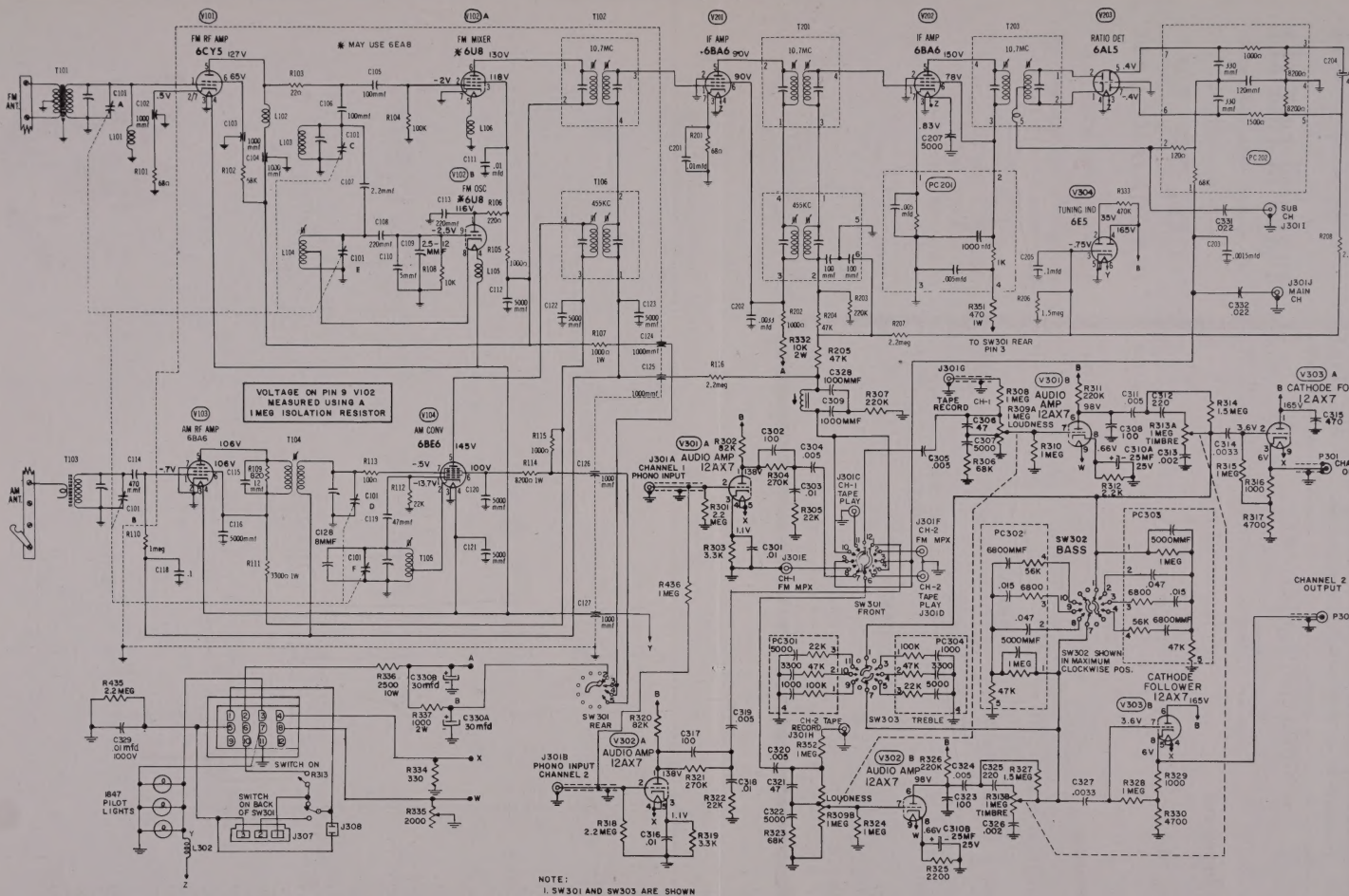
First of the Famous Sams 16 Lesson

COLOR TV TRAINING COURSE

Dear Friend of PHOTOFACT:

The Color TV Training Course which begins in this Set, gives me a welcome opportunity to accomplish two purposes: First, it enables me to bring to you the timely, up-to-the-minute training help we are pledged to provide our customers. And second, it gives me a chance to say "thank you" for your support and loyalty.

Cordially, Howard W. Sams


FM RF AMP 6CY5
* MAY USE 6EA8
FM MIXER * 6U8
FM OSC * 6U8
IF AMP 6BA6
IF AMP 6BA6
RATIO DET 6AL5
AM RF AMP 6BA6
AM CONV 6BE6
AUDIO AMP 12AX7 LOUDNESS
AUDIO AMP 12AX7
CATHODE FOLLOWER 12AX7
TUNING IND 6E5
VOLTAGE ON PIN 9 V102 MEASURED USING A 1MEG ISOLATION RESISTOR
J301A AUDIO AMP CHANNEL 1 PHONO INPUT
J301B PHONO INPUT CHANNEL 2
J301C CH-1 TAPE PLAY
J301D CH-2 TAPE PLAY
J301E CH-1 FM MPX
J301F CH-2 FM MPX
J301G TAPE RECORD
J301H CH-2 TAPE RECORD
J301I SUB CH
J301J MAIN CH
SW301 FRONT
SW301 REAR
SW302 BASS
SW303 TREBLE
SW302 SHOWN IN MAXIMUM CLOCKWISE POS.
SWITCH ON
SWITCH ON BACK OF SW301
#847 PILOT LIGHTS
CHANNEL 1 OUTPUT
CHANNEL 2 OUTPUT
TO SW301 REAR PIN 3
NOTE:
1. SW301 AND SW303 ARE SHOWN IN MAXIMUM COUNTERCLOCKWISE POSITION.
2. VOLTAGES MEASURED WITH VTVM AND WITH SW301 IN FM POSITION EXCEPT FOR V103 & V104. THESE ARE MEASURED IN AM POSITION, VOLUME CONTROL SET AT MINIMUM, OTHERS SET AT MAXIMUM. LINE VOLTAGE 117V NORMAL VOLTAGE TOLERANCE 20%.

MAGNAVOX CHASSIS 54-05-00

For Additional Information See PHOTOFACT Folder 11-SET452

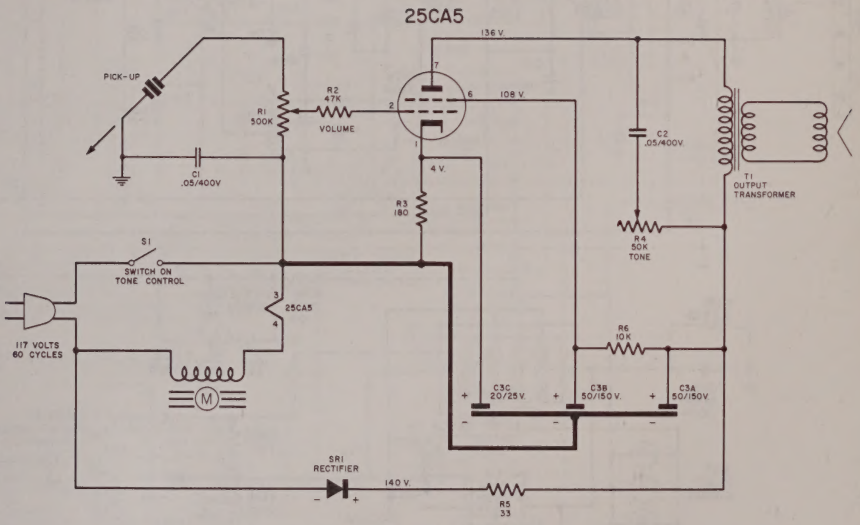
Schematic Diagram Courtesy of The Magnavox Company

MODEL IDENTIFICATION CHART

MODEL	COLOR
BP 1812	Blue and White
GP 1812	Green and White
RP 1812	Red and White
TP 1812	Brown and White

SPECIFICATIONS

POWER SUPPLY: 117 volts, 60 cycles, AC.
POWER CONSUMPTION: 40 watts
SPEAKER: 4 inch. PM, 3.2 ohms
CARTRIDGE: Wide-Range Turnover Type



WEBCOR MODELS BP1812, GP1812, RP1812, TP1812

Schematic Diagram Courtesy of Webcor, Inc.

PHOTOFACT® Folder with CIRCUITRACE®

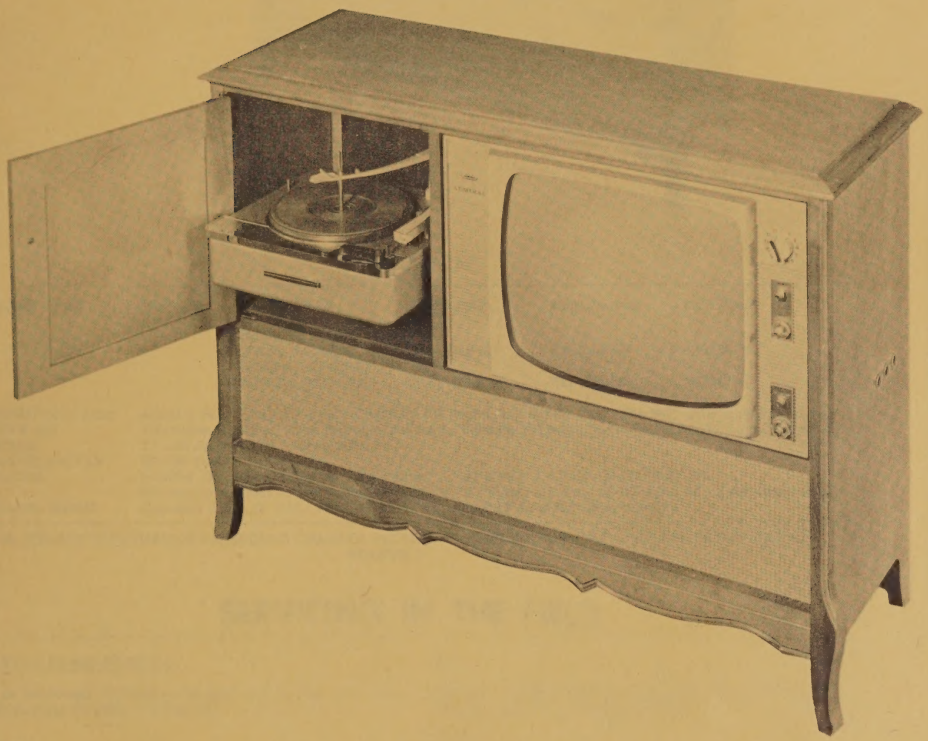
ADMIRAL
CHASSIS 15H1, 15H1U, 3Y1

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

ADMIRAL
CHASSIS 15H1, 15H1U, 3Y1



ADMIRAL
CHASSIS 15H1, 15H1U, 3Y1

MODEL ST19J169

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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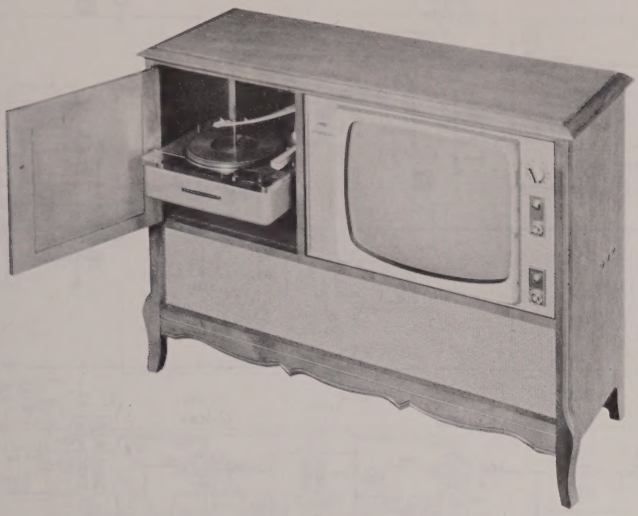


MODEL ST19J169

TRADE NAME	ADMIRAL	MODELS	TV Chassis	Amp. Chassis	VHF Tuner
		ST19J151, ST19J152, ST19J153, ST19J169	15H1 (Run 10)	3Y1 (Run 10)	94E184-11
		ST19J151U, ST19J152U, ST19J153U, ST19J169U ...	15H1U (Run 10)	3Y1 (Run 10)	94E164-17
MANUFACTURER	Admiral Sales Corp., Service Division, 903 Morrissey Drive, P.O. Box 845, Bloomington, Illinois				
TYPE SET	Television Receiver (With Stereo Audio Amp. Chassis 3Y1 and 4 Speed Automatic Record Changer *)				
TUBES	TV and Amp.: VHF - Seventeen				
POWER SUPPLY	110-120 Volts AC, 60 Cycle				
RATING	Selector (Function) Switch in TV Position: 175 Watts, 1.6 Amp. @ 117 Volts AC Selector (Function) Switch in Stereo Position: 120 Watts, 1.1 Amp. @ 117 Volts AC, Less Phono Motor				
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)				

* FOR SERVICE INFORMATION ON RECORD CHANGER #RC7EOC-17AF OR RC7FOC-17AF - SEE PHOTOFACT SET 529 FOLDER 3

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

It is necessary to remove chassis and picture tube for safety glass cleaning and removal.

FUSE

A fuse wire is used for filament protection. (For location, see M1 in photo, Page 15.

FUSE DEVICE

A Circuit Breaker is used for low voltage power supply protection, and may be reset by depressing the reset button. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENT

To touch up VHF Oscillator, remove Channel Selector knob.

AGC

The AGC may be varied by means of an AGC Control. (For location, see "Tube Placement Chart".)

FOCUS

The focus may be varied by connecting the lead from pin 4 of the picture tube to various voltage points. (For location, see photo "Chassis - Top View".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

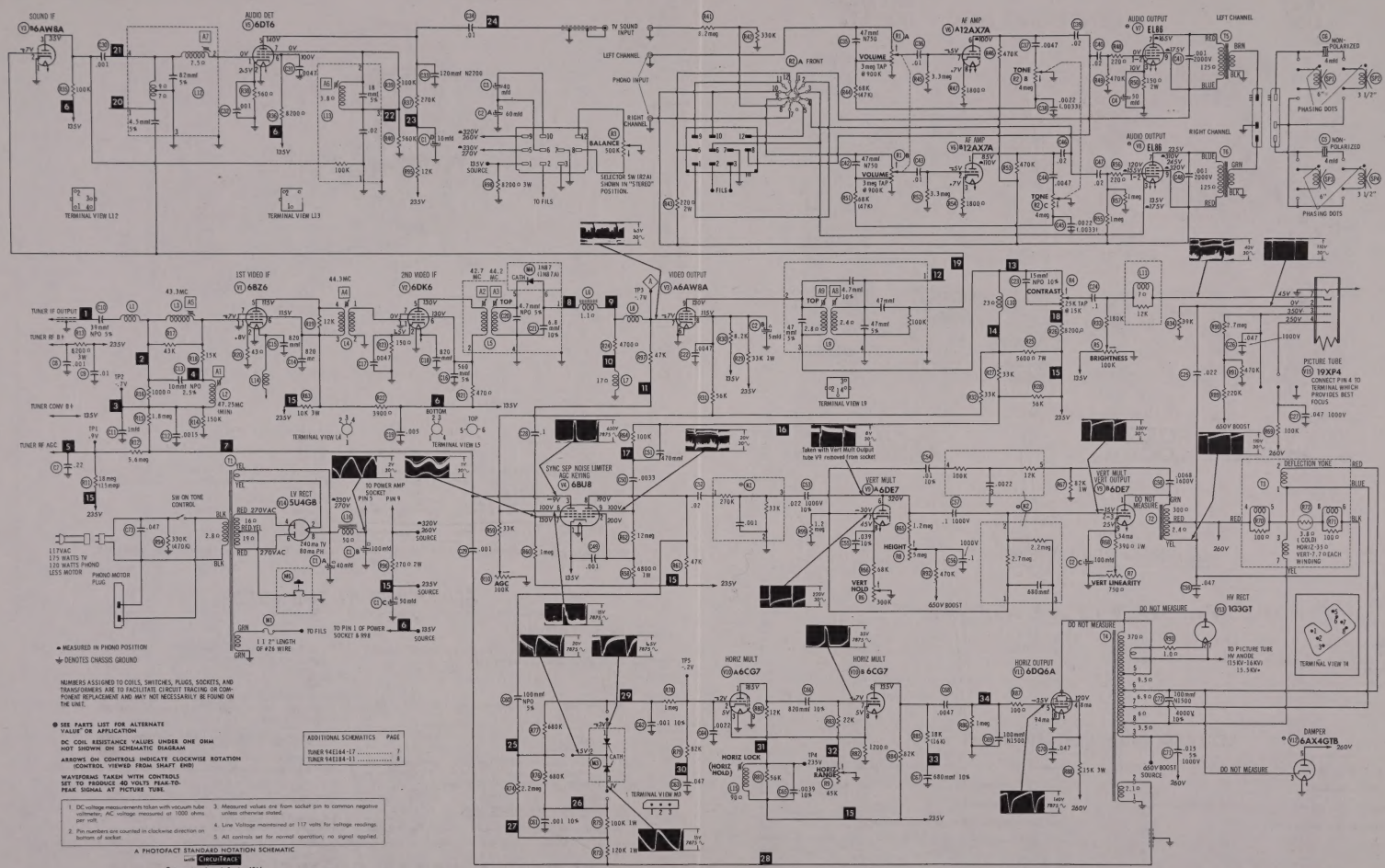
The Horizontal Lock is used for the Horizontal Hold. (See page 20 for complete horizontal sweep circuit adjustments).

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America


SOUND IF
6AW8A
AUDIO DET
6DT6
TV SOUND INPUT
LEFT CHANNEL
PHONO INPUT
RIGHT CHANNEL
BALANCE 500K
SELECTOR SW (R2A) SHOWN IN "STEREO" POSITION.
TO FILS
AF AMP
12AX7A
VOLUME
TONE
AUDIO OUTPUT
EL86
LEFT CHANNEL
RIGHT CHANNEL
NON-POLARIZED
4mfd
PHASING DOTS
TERMINAL VIEW L12
TERMINAL VIEW L13
1ST VIDEO IF
6BZ6
2ND VIDEO IF
6DK6
VIDEO OUTPUT
6AW8A
TUNER IF OUTPUT
TUNER RF B+
TUNER CONV B+
TUNER RF AGC
43.3MC
44.3MC
42.7 MC
44.2 MC
1N87 (1N87A)
TERMINAL VIEW L4
TERMINAL VIEW L5
TERMINAL VIEW L9
SYNC SEP NOISE LIMITER AGC KEYING
6BU8
Taken with Vert Mult Output tube V9 removed from socket
VERT MULT
6DE7
VERT MULT VERT OUTPUT
6DE7
DO NOT MEASURE
HEIGHT
VERT HOLD
VERT LINEARITY
650V BOOST
BRIGHTNESS
CONTRAST
PICTURE TUBE
19XP4
CONNECT PIN 4 TO TERMINAL WHICH PROVIDES BEST FOCUS
DEFLECTION YOKE
SW ON TONE CONTROL
LV RECT
5U4GB
HV RECT
1G3GT
TO PICTURE TUBE HV ANODE (15.5KV-16KV) 15.5KV•
TERMINAL VIEW T4
117VAC 175 WATTS TV 120 WATTS PHONO LESS MOTOR
PHONO MOTOR PLUG
TO FILS
TO PIN 1 OF POWER SOCKET & 998
TO POWER AMP SOCKET PIN 3 PIN 9
235V SOURCE
320V 260V SOURCE
135V SOURCE
HORIZ MULT
A6CG7
HORIZ MULT
6CG7
HORIZ OUTPUT
6DQ6A
HORIZ LOCK (HORIZ HOLD)
HORIZ RANGE
DAMPER
6AX4GTB
TERMINAL VIEW V3
TERMINAL VIEW V5
TERMINAL VIEW V9
TERMINAL VIEW V10
TERMINAL VIEW V11
• MEASURED IN PHONO POSITION
⏚ DENOTES CHASSIS GROUND
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUES ON APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 40 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
ADDITIONAL SCHEMATICS PAGE
TUNER 94E184-17 7
TUNER 94E184-11 8
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUIT AID
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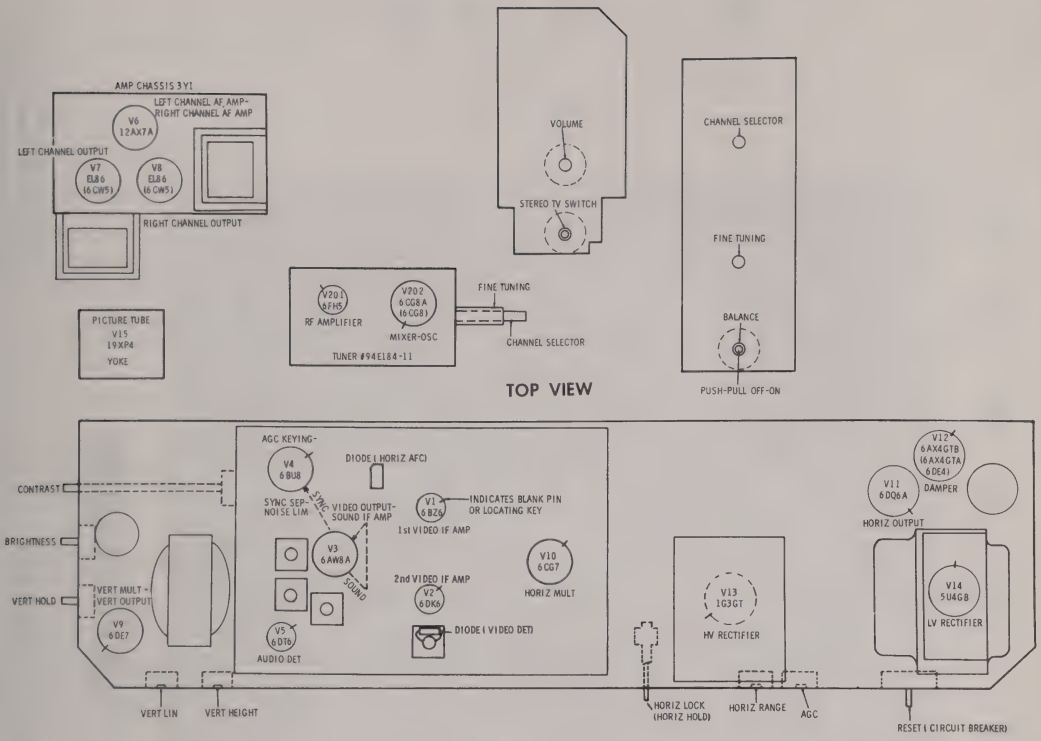
ADMIRAL CHASSIS 15H1, 15H1U, 3Y1

TUBE PLACEMENT CHART



ADMIRAL
CHASSIS 15H1, 15H1U, 3Y1

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

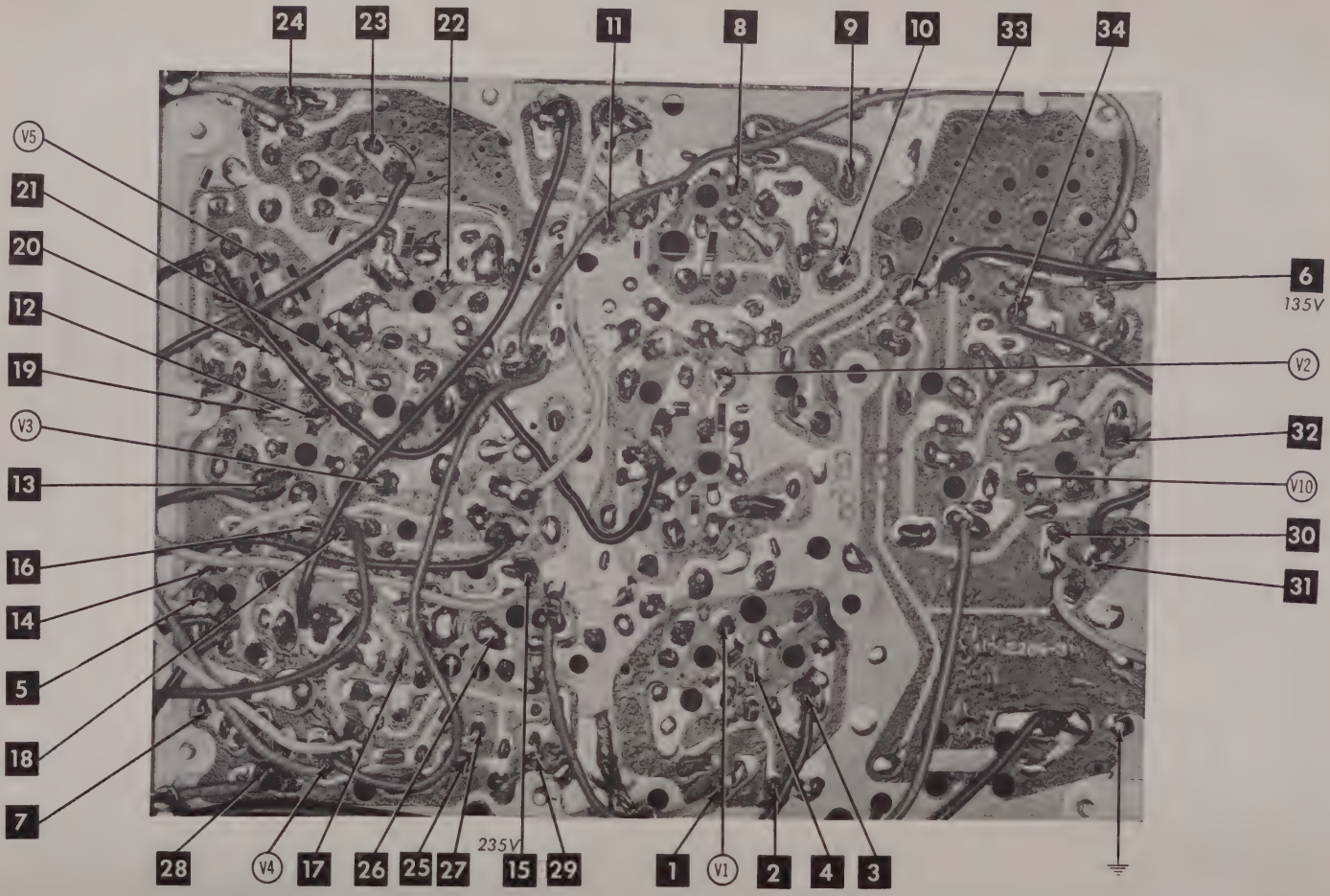
POWER SUPPLY FAILURE
No raster, no sound Circuit Breaker, V14, V8

SWEEP FAILURE
No raster, has sound V10, V11, V12, V13, V15
No vertical deflection V9
Poor vert. linearity or foldover V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, V14
Vert. off freq. V9
Horiz. off freq. Diodes (Horiz. AFC), V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, Diode (Video Det.), V3
No pic, no sound, has snow V201, V202
No pic, has sound, has raster V3, V15
Has pic, no sound V3, V5, V6, V8
Overloaded picture V4

SYNC FAILURE
No vert. sync V4
No horiz. sync V4, Diodes (AFC)
No vert. or horiz. sync V4

FOLDER 1



A Howard W. Sams CIRCUITRACE® Photo

TV PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools:

A1	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A2 thru A9	GENERAL CEMENT #8282, 8606, 8606L, 9295 WALSCO #2526, 2543, 2544, 2545
Mixer Plate Coil	GENERAL CEMENT #9296, 9297 WALSCO #2546, 2547

VIDEO IF ALIGNMENT

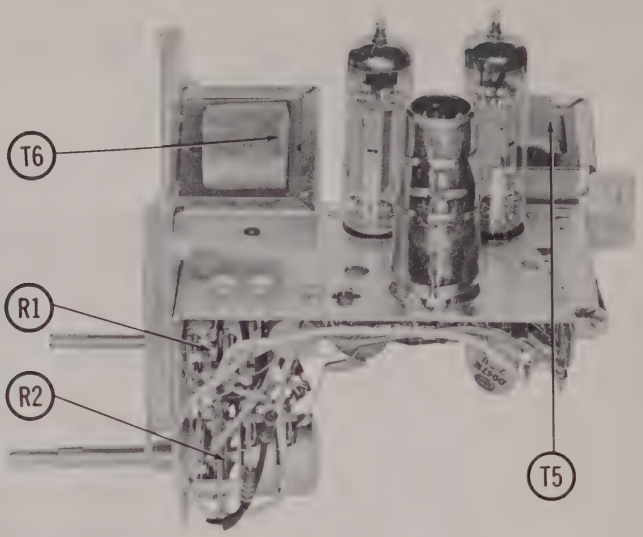
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough generator output to provide a usable indication on VTVM.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	High side to ungrounded tube shield floating over Mixer-Osc. (V202). Low side to chassis.	Not used	47.25MC (Unmod.)	Any non-interfering channel	USE VTVM DC probe thru 47K to point (A). Common to chassis. (Across Video Det. load)	A1	Adjust for MINIMUM deflection.
2.	"	"	44.2MC	"	"	A2	Adjust for maximum deflection.
3.	"	"	42.7MC	"	"	A3	"
4.	"	"	44.3MC	"	"	A4	"
5.	"	"	43.3MC	"	"	A5	"
6.	"	"	44.8MC	"	"	Mixer Plate Coil	"
7.	"	44.0MC (10MC Swp.)	42.25MC 45.75MC	"	Vert. Amp. thru 47K to point (A). Low side to chassis.		Check for response similar to Fig. 1. If necessary, retouch SLIGHTLY A2 thru A5 and Mixer Plate Coil for desired response.

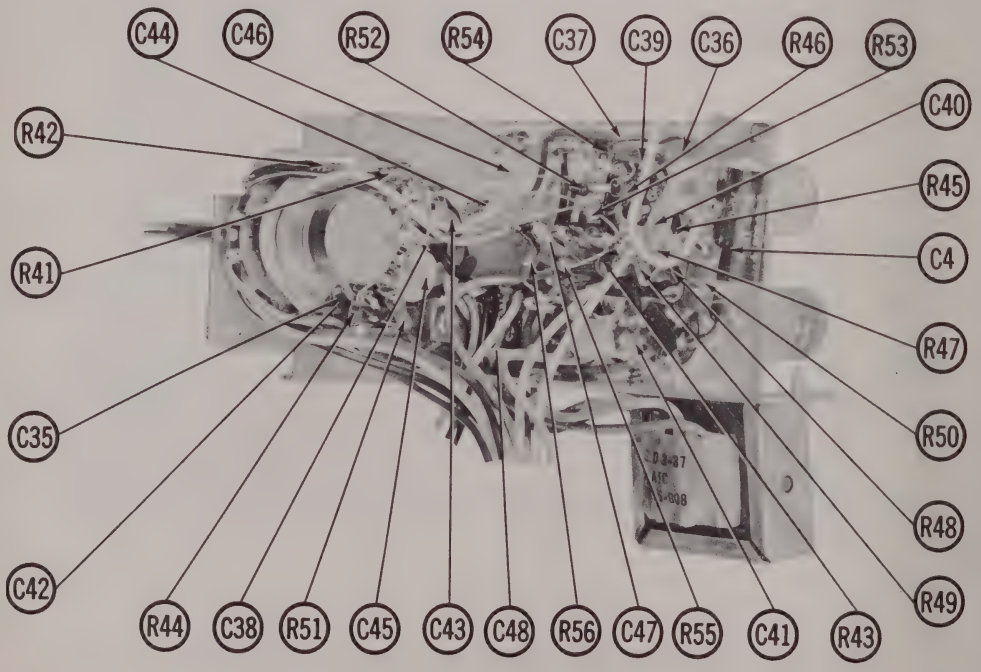
SOUND IF ALIGNMENT

Tune in a strong TV signal and adjust controls for normal operation.
Turn A6 slowly counterclockwise until a buzz is heard in the sound. Turn counterclockwise for maximum undistorted sound. Reduce the signal at the antenna terminals (by use of an adjustable attenuator or disconnecting antenna) until a strong hiss similar to super-regeneration is heard in the sound.
Carefully adjust A7 for maximum undistorted sound with MINIMUM hiss. If the hiss disappears during alignment, further reduce signal until hiss returns and retouch A7.
Carefully adjust A8 for MINIMUM 4.5MC beat interference in picture.
Carefully adjust A9 for maximum undistorted sound with MINIMUM hiss. If the hiss disappears, further reduce signal until hiss returns and retouch A9.

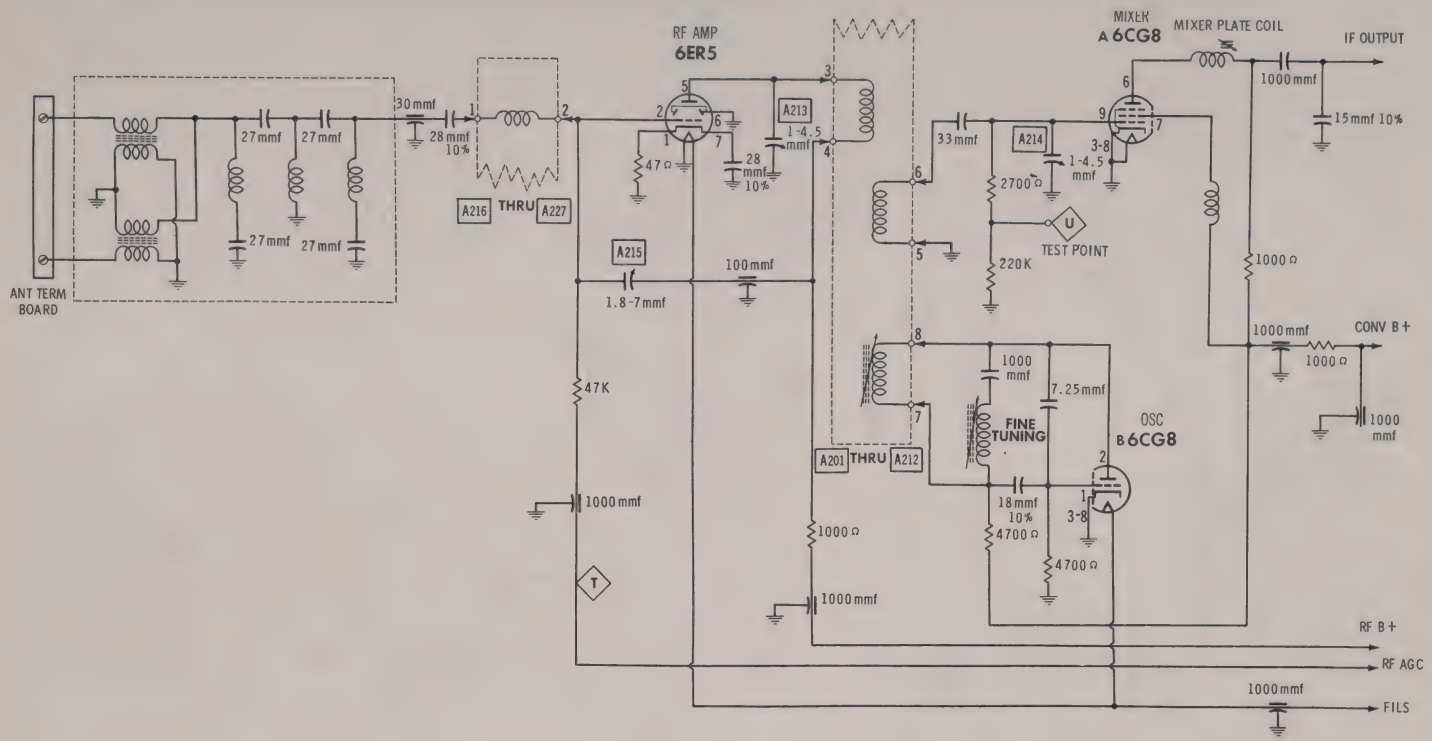
FIG 1



AMP CHASSIS 3Y1 - TOP VIEW



AMP CHASSIS 3Y1 - BOTTOM VIEW



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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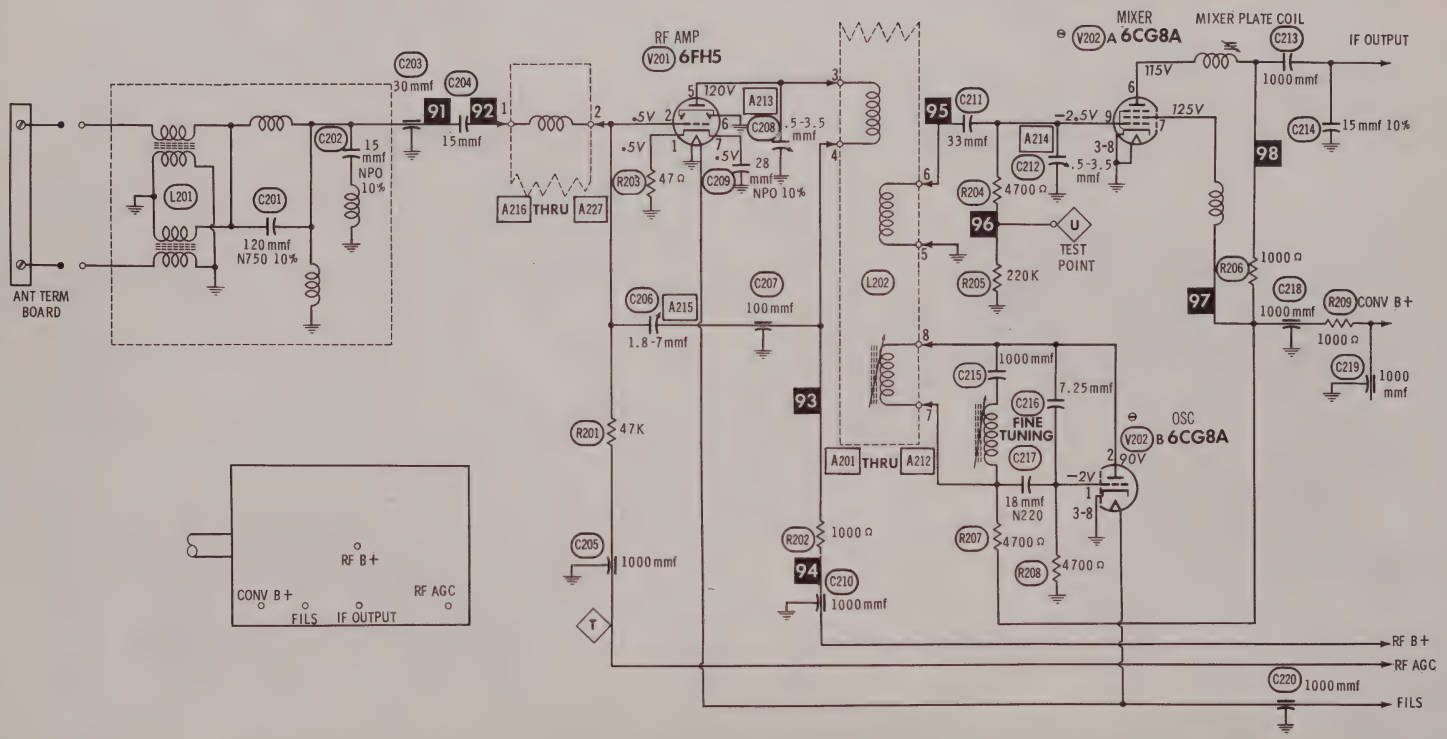
TUNER 94E164-17

ADMIRAL
CHASSIS 15H1, 15U, 3Y1



A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE

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TUNER 94E184-11

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A212 ..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A213, A214, A215 ..... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. load	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
		207MC	205.25MC 209.75MC	12		A202	
		201MC	199.25MC 203.75MC	11		A203	
		195MC	193.25MC 197.75MC	10		A204	
		189MC	187.25MC 191.75MC	9		A205	
		183MC	181.25MC 185.75MC	8		A206	
		177MC	175.25MC 179.75MC	7		A207	
		85MC	83.25MC 87.75MC	6		A208	
		79MC	77.25MC 81.75MC	5		A209	
		69MC	67.25MC 71.75MC	4		A210	
		63MC	61.25MC 65.75MC	3		A211	
		57MC	55.25MC 59.75MC	2		A212	

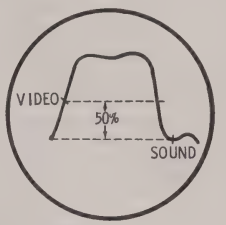


FIG. 201

RF AND MIXER ALIGNMENT

Connect the negative lead of a variable bias supply to point (T). Positive to chassis. Set bias for 2.5 volts.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point (U). Common to chassis.	A213, A214, A215	Adjust A213 and A214 for maximum amplitude and symmetry with markers as shown in Fig. 202. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A215 to obtain MINIMUM response on the scope.
3.	"	213MC	211.25MC 215.75MC	13	"	A216	Adjust for maximum amplitude of response similar to Fig. 202. Adjust by expanding or compressing coil turns.
		207MC	205.25MC 209.75MC	12		A217	
		201MC	199.25MC 203.75MC	11		A218	
		195MC	193.25MC 197.75MC	10		A219	
		189MC	187.25MC 191.75MC	9		A220	
		183MC	181.25MC 185.75MC	8		A221	
		177MC	175.25MC 179.75MC	7		A222	
		85MC	83.25MC 87.75MC	6		A223	
		79MC	77.25MC 81.75MC	5		A224	
		69MC	67.25MC 71.75MC	4		A225	
		63MC	61.25MC 65.75MC	3		A226	
		57MC	55.25MC 59.75MC	2		A227	

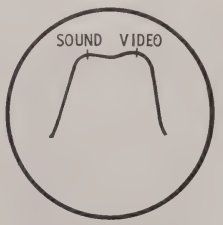


FIG. 202

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	GENERAL ELECTRIC / RAYTHEON / SYLVANIA — USE	TYPE
V1	1st Video IF Amp.	6BZ6
V2	2nd Video IF Amp.	6DK6
V3	Video Output - Sound IF Amp.	6AW8A
V4	AGC Keying - Sync Sep. - Noise Limiter	6BU8
V5	Audio Detector	6DT6
V6	Left Channel AF Amp. - Right Channel AF Amp.	12AX7A
V7	Left Channel Output	EL86 (6CW5) *
V8	Right Channel Output	EL86 (6CW5) *
V9	Vert. Mult. - Vert. Output	6DE7
V10	Horiz. Mult.	6CG7
V11	Horiz. Output	6DQ6A
V12	Damper	6AX4GTB (6AX4GTA, 6DE4) *
V13	HV Rectifier	1G3GT
V14	LV Rectifier	5U4GB

* Alternate

PICTURE TUBE

ITEM No.	REPLACEMENT DATA: ADMIRAL Part No.	GENERAL ELECTRIC Part No.	RCA Part No.	RAYTHEON Part No.	SYLVANIA Part No.	NOTES
V15	19XP4		19XP4 ①		19XP4 ②	① Aluminized ② Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP	VOLT.	ADMIRAL Part No.	AEROVOX Part No.	CORNELL-DUBILIER Part No.	MALLORY Part No.	PYRAMID Part No.	SPRAGUE Part No.	NOTES
C1A	x40	400	67D15-349	AFH4-58-75		FP333.96	TMT-3799	TVL-3889.3	
B	x100	400				TC79	TD-50-450	TVA-1712	
C	x50	350							
D	10	350							
C2A	x60	200	67D15-332	AFH2-84-60	BO516	WP318.5	TMD-2380	TVL8-3468 *	
B	x5	200			BR435		TD-100-50		
C	100	50							
C3	40	200	67B4-21	PRH5180	BR4025	TC58	TD-40-350	TVA-1511	
C4	50	15	67D15-3	PT773	BR850-25	TC39	TD-50-25	TVA-1306	
C5	4	16NP	67A40-2	PRH7405	BBR4-150	TCN504		TVAN8-1203.2*	
C6	4	16NP	67A40-2	PRH7405	BBR4-150	TCN504		TVAN8-1203.2*	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ELMENCO Part No.	MALLORY Part No.	SPRAGUE Part No.
C7	.22 200V		P288N-22		CUB3P22	2DP-4-224	GRM-2022	2TM-P22
C8	.001		BPD-001	DD-102	BYA10I2	CCD-102	B-210	5HK-D10
C9	.01		BPD-01	DD-103	BYA10I3	CCD-103	B-110	5HK-S10
C10	39 NPO 5%			TCZ-39	C10Q39C		CNO-439	10TCC-Q39
C11	1 100V		P288N-1.0		CUB2W1	1DP-5-105	GRM-31	2TM-M1
C12	.0015		BPD-0015	DD-153	BYA10D15	CCD-152	B-215	5HK-D15
C13	10 NPO 2.5%	#65D6-115		TCZ-10				
C14	820		DI-820	DD-821	BYA10T82	CCD-821	B-382	10TS-T82
C15	820		DI-820	DD-821	BYA10T82	CCD-821	B-382	10TS-T82
C16	560	5%			CM-193-561J	MB-556	MB-556	MB-3-246
C17	.0047		BPD-0047	DD-472	BYA10D47M	CCD-472	B-347	5HK-D47
C18	820		DI-820	DD-821	BYA10T82	CCD-821	B-382	10TS-T82
C19	.005		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C20	4.7 NPO 5%		NPO-DI 4.7	DTZ-4R7	C10Y47C	CCTO-4R7	CNO-547	10TCC-Y47
C21	6.8	10%	NPO-DI 6.8	TCZ-6R8	C10Y68C	CCTO-6R8	CNO-568	10TCC-Y68
C22	.0047		BPD-0047	DD-472	BYA10D47M	CCD-472	B-347	5HK-D47
C23	.01		BPD-001	DD-103	BYA10I3	CCD-102	B-210	5HK-D10
C24	15 NPO 10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C25	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C26	.022 600V		P688N-022	DD-303	CUB6S22	6DP-2-223	GRM-6022	6TM-S22
C27	.047 1000V		P1088N-047		CUB10S47	16DP-5-473	GRM-10147	10TM-S47
C28	.047 1000V		P1088N-047		CUB10S47	16DP-5-473	GRM-10147	10TM-S47
C28	.1 400V		P415N-1	DF-104	BC6P1J	4DP-3-104	ACE6D1	4SF-P10
C29	.001		BPD-001	DD-102	BYA10I2	CCD-102	B-210	5HK-D10
C30	.001		BPD-001	DD-102	BYA10I2	CCD-102	B-210	5HK-D10
C31	.0047		BPD-0047	DD-472	BYA10D47M	CCD-473	B-347	5HK-D47
C32	.001		BPD-001	DD-103	BYA10I3	CCD-102	B-210	5HK-D10
C33	120 N2300					*		
C34	.01		BPD-01	DD-103	BYA10I3	CCD-103	B-110	5HK-S10
C35	47 N750		N750-DI 47	DTZ-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C36	.01		BPD-01	DD-103	BYA10I3	CCD-103	B-110	5HK-S10
C37	.0047		BPD-0047	DD-472	BYA10D47M	CCD-473	B-347	5HK-D47
C38	.0022	(.0033) †	BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C39	.02		BPD-02	DD-203	BYB582	CCD-203	B-130	5HK-S20
C40	.02		BPD-02	DD-203	BYB582	CCD-203	B-130	5HK-S20
C41	.001 2000V		HVD-30-1000	DD30-102	HVB30D1	3CCD-102	2HV-210	BL-D10
C42	47 N750		N750-DI 47	DTZ-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C43	.01		BPD-01	DD-103	BYA10I3	CCD-103	B-110	5HK-S10
C44	.0047		BPD-0047	DD-472	BYA10D47M	CCD-473	B-347	5HK-D47
C45	.0022	(.0033) †	BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C46	.02		BPD-02	DD-203	BYB582	CCD-203	B-130	5HK-S20
C47	.02		BPD-02	DD-203	BYB582	CCD-203	B-130	5HK-S20
C48	.001 2000V		HVD-30-1000	DD30-102	HVB30D1	3CCD-102	2HV-210	BL-D10
C49	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C50	.0033		BPD-0033	DD-332	BYA10D33	CCD-332	B-233	5HK-D33
C51	470		DI-470	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C52	.02		BPD-02	DD-203	BYB582	CCD-203	B-130	5HK-S20
C53	.022 1000V 10%		P1084CM-0012		DPME58A22	16DP-5-223	GEM-10022	10TM-S22
C54	.01 600V 10%		V84C6S-10%		PM6S1	6DP-2-103	GEM-611	6TM-S10
C55	.039 600V 10%		P684CM-039		DPM6S39	6DP-2-393	GEM-614	6TM-S39
C56	.1 1000V		P1088N-1		CUB10P1		GEM-1001	10TM-P10
C57	.1 1000V		P1088N-1		CUB10P1		GEM-1001	10TM-P10
C58	.0068 1800V		P1684CM-0016		CUB16D68	16DP-3-702	GEM-16268	MB-D68
C59	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C60	100 NPO 5%			TCZ-100	C10T1C		CNO-S10	10TC-T10
C61	.001 10%		DI-1000	DD-102	5R5D1	CCD-102	GP210	10TS-D10
C62	.001 10%		DI-1000	DD-102	5R5D1	CCD-103	GP210	10TS-D10
C63	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C64	.0022		BPD-0022	DD-222	BYA10D22	CCD-232	B-222	5HK-D22
C65	.0039 10%		1464-0039		1R5D39	CM-203-332K	MC1452.5	MS-339
C66	820 10%		1469-00082		5R5T82	CM-193-82K	MCR251	MS-382
C67	680 10%		1469-00068		5R5T68	CM-193-68K	MCJ249	MS-368
C68	.0047		BPD-0047	DD-472	BYA10D47M	CCD-472	B-347	5HK-D47
C69	100 N1500			TCL-100		*		
C70	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C71	.015 1000V 5%	#64B2-59						

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ELMENCO Part No.	MALLORY Part No.	SPRAGUE Part No.
C72	100 4000V N1500 10%	#65D10-212						
C73	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47

Admiral Part Number † Alternate Value
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: ADMIRAL Part No.	CENTRALAB Part No.	CLAROSTAT Part No.	CTS-IRC Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	3meg 900K Tap	½	75D67-5					Volume, Left Channel
B	3meg 900K Tap	½						Volume, Right Channel
R2A	Switch		75D49-4					Selector
B	4meg	½						Tone, Left Channel
C	4meg	½						Tone, Right Channel
R3A	500K	½	75B45-5	FI-40				Balance
B	Switch			RPL-41				Push-Pull Off-On
R4	25K	½	75B70-1				UX4226-S	Contrast
	15K Tap							
R5A	100K	½	75D20-133		A47-100K-S	B11-128	U41	Brightness
B	Shaft				RS-3/16	SK3	D8-37	
R6A	300K	½	75D20-132		A47-300K-S	B11-131	U46	Vert. Hold
B	Shaft				RS-3/16	SK3	D8-37	
R7A	750Ω	½	75D20-124	TT-411	B47-750-S	B11-105	FTA751L	Vert. Linearity
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	
R8	5meg	½	75D20-119	TT-87	B47-5meg-S	ELC-5	FTA5S1L	Height
R9A	45K	½	75D20-131	TT-31	B47-50K-S	B11-123	FTA54L	Horiz. Range
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	
R10A	100K	½	75D20-118	AB-38	B47-100K-S	B17-138	FTA1SL	AGC
B	Shaft			AK-1	Not Req.	TM4	Not Req.	

† "STA-LOC" Equivalent: FA55L, RUP16A, OS2500.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA: IRC Part No.	WORKMAN TV Part No.	REMARKS
R11	15meg			
R12	5.6meg			
R13	8200Ω 3W	PW8-8200	3G-8200	
R14	180K			
R15	1.5meg			
R16	1000Ω			
R17	43K			
R18	15K			
R19	12K			
R20	43Ω			
R21	470Ω			
R22	3900Ω			
R23	150Ω			
R24	4700Ω			
R25	5600Ω 7W	PW7-5600	10W-SQ-5600	
R26	330Ω 1W			
R27	33K			
R28	56K			
R29	33K 1W			
R30	6200Ω			
R31	56K			
R32	33K			
R33	180K			
R34	39K			
R35	100K			
R36	5200Ω			
R37	270K			
R38	560Ω			
R39	100K			
R40	560K			
R41	5.2meg			
R42	330K			
R43	220Ω 2W			
R44	68K			(47K) *
R45	3.3meg			
R46	470K			
R47	1800Ω			
R48	220Ω			
R49	470K			(47K) *
R50	150Ω 2W			
R51	68K			(47K) *
R52	3.3meg			
R53	470K			
R54	1800Ω			
R55	meg			

ITEM No.	RATING	REPLACEMENT DATA: IRC Part No.	WORKMAN TV Part No.	REMARKS
R56	220Ω			
R57	1meg			
R58	6800Ω 1W			
R59	33K			
R60	1meg			
R61	47K			
R62	12meg			
R63	10K 3W	PW3-10K	3G-10K	
R64	100K			
R65	1.2meg			
R66	68K			
R67	82K 1W			
R68	3900Ω 1W			
R69	100K			
R70	100Ω			
R71	100Ω			
R72	3.8Ω (Cold)			#61A27
R73	1.2K			
R74	2.2meg			
R75	100K 1W			
R76	680K			
R77	680K			
R78	1meg			
R79	82K			
R80	12K			
R81	56K			
R82	1200Ω			
R83	22K			
R84	82K			
R85	18K			(16K) *
R86	1meg			
R87	100Ω			
R88	15K 3W	PW3-15K	3G-15K	
R89	220K			
R90	2.7meg			
R91	470K			
R92	470K			
R93	1.0Ω			
R94	330K			(470K) *
R95	12K			
R96	270Ω 2W			
R97	47K			
R98	8200Ω 3W	PW3-8200	3G-8200	
R99	1.2meg			

* Alternate Value # Admiral Part Number

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: ADMIRAL Part No.	Merit Part No.	Miller Part No.	Stancor Part No.	Workman TV Part No.	NOTES
L1	RF Choke	72B37-8					
L2	47.25MC Trap	72C132-44				TF399	
L3	1st Video IF	72C132-41				TA293	
L4	2nd Video IF	72C132-42				TA294	
L5	3rd Video IF	72B207-2					
L6	RF Choke (12uh)	72B31-4	BC-566	4632	RTC-8523	T861	
L7	Peaking (530uh)	72C5-20	TV-488	6174	RTC-8592	T334	
L8	RF Choke (28uh)	72B31-3	TV-192	4636	RTC-8525	T894	
L9A	4.5MC Trap	72C185-2				T277	
B	1st Sound IF						
L10	Peaking (900uh)	72C5-34	TV-308	5157	RTC-8589	T363	
L11	Peaking (190uh)	72C5-40 ①	TV-197 ▲	5154 ▲	RTC-8597 ▲	T312 ▲	① Wound on 12K Resistor. ▲ Parallel with 12K Resistor.
L12	2nd Sound IF	72C208-1				TB248	
L13	Quadrature	72C132-37					
L14	Fil. Choke (1.4ch)	72B37-2	BC-562	4604	RTC-8516	T856	

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: ADMIRAL Part No.	Merit Part No.	Miller Part No.	Rogers Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	Workman TV Part No.
L15	Horiz. Stabilizer	94C17-7	TV-183	6110	RC110	RTC-8622	H5-5	WLC-25	T103

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 ^a/1	REPLACEMENT DATA: ADMIRAL Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
L16	.340A	50Ω	1 Hy.	74C18-36		C-2343	26C44 ①	C-28X	① Drill new mounting hole(s).

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC 1	SEC 2	SEC 3	SEC 4	SEC 5	REPLACEMENT DATA: ADMIRAL Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
T1	117V	@ 1.6A	540VCT @ .340A DC	5V @ 3A			80D73-3	P-2882	P-8356	R-75BA		
				6.3V @ 8.5A								

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: ADMIRAL Part No.	Merit Part No.	Rogers Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
T2	Vert. Output	79C43-20					A-140X	
T3	Yoke (Horiz. 18MH) (14Ω) (Vert. 12MH) Rear Cover and Centering Device	94D83-3 †			DY-27A ①	Y-52 ①	Y-60-1	
T4	Horiz. Output	79D83-4				FLY-174	D-203	

† Less Rear Cover and Centering Device.
① Use original yoke damping network if necessary. Requires new rear cover and centering device.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: ADMIRAL Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
T5	3500Ω	3-4Ω	79D33-37					
T6	2500Ω	3-4Ω	79D33-37					

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: ADMIRAL Part No.	QUAM Part No.	NOTES
SP1	8"	PM	3-4Ω	78D163-4	8A1	
SP2	3½"	PM	3-4Ω	78C148-7	3A1ST24	
SP3	6"	PM	3-4Ω	78D163-4	6A1	
SP4	3½"	PM	3-4Ω	78C148-7	3A1ST24	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ADMIRAL Part No.	REPLACEMENT DATA
K1	Vert. Integrator	.001mfd, 33K, 270K	63D6-21 Note 1	
K2	Vert. Output Grid & Plate	680mmf, .0022mfd, 12K, 100K, 2.2meg, 2.7meg	63D6-22 Note 1	

Note 1. Some versions may use individual components in this application.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: ADMIRAL Part No. FUSE	HOLDER	LITTELFUSE Part No. FUSE	HOLDER	BUSS Part No. FUSE	HOLDER
M1	1½"	length of #26 wire						

PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	REPLACEMENT DATA: ADMIRAL Part No. CARTRIDGE	NEEDLE*	ASTATIC Part No. CARTRIDGE	NEEDLE*	ELECTRO-VOICE Part No. CARTRIDGE	NEEDLE*	SONOTONE Part No. CARTRIDGE	NEEDLE*	NOTES
M2	409B33-2-1	98C15-102 * (LP)	13TBX	Not Req.	26T	S1-1 *	8TA4-SD	N-STA-SD	
		98C15-101 * (78)				S1-3 *			

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: ADMIRAL Part No.	GENERAL ELECTRIC Part No.	RAYTHEON Part No.	SYLVANIA Part No.	NOTES
M3		93B5-6 *	6GC1 *			* AFC Diode, Dual Selenium, Common Cathode Type † Video Detector (Pigtail)
M4	1N87 † or 1N87A			1N87 † 1N87A	1N87 † 1N87A	

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M5	Tuner	94E184-11	VHF, STANDARD COIL REPLACEMENT #GG-4220-A *
	Tuner	94E164-17	VHF with UHF Provisions
M6	Circuit Breaker	84A17-1	
M7	Motor	407C34-1	Phono Drive (Changer #RC7EOC-17AF)
	Motor	407C33-1	Phono Drive (Changer #RC7FOC-17AF)

* Use original shafts and front mounting cover.

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor)
		8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors
		8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor
		8485 (Round) - 5 Conductor
		8488 (Round) - 8 Conductor

VHF TUNER PARTS LIST AND DESCRIPTIONS

94E184-11

TUBES

• GENERAL ELECTRIC •			• RAYTHEON • SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amp.	6FH5	V202	Mixer - Osc.	6CG8A (6CG8) *

* Alternate

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	120 N750 10%			TCN-120	C10T12U	CCTN-121	CN7-313	10TCU-T12
C202	15 NPO 10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C203	30							
C204	15		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C205	1000		EF-001	MFT-102		CCF-102	CT280A	
C206	1.8-7			829-7				
C207	100		EF-0001	MFT-100				
C208	.5-3.5							
C209	28 NPO 10%			TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C210	1000		EF-001	MFT-102		CCF-102	CT280A	
C211	33		NPO-DI 33	DTZ-33	C10Q33C	CCTO-330	CNO-433	10TCC-Q33
C212	.5-3.5							
C213	1000		EF-001	DD-102	BYA10DI	CCD-102	B-210	5HK-D10
C214	15 10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C215	1000		BPD-001	DD-102	BYA10DI	CCD-102	B-210	5HK-D10
C216	7.25							
C217	18 N220					*		10TCR-Q18
C218	1000		EF-001	MFT-1000		CCF-102	CT280A	
C219	1000		EF-001	MFT-1000		CCF-102	CT280A	
C220	1000		EF-001	MFT-1000		CCF-102	CT280A	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

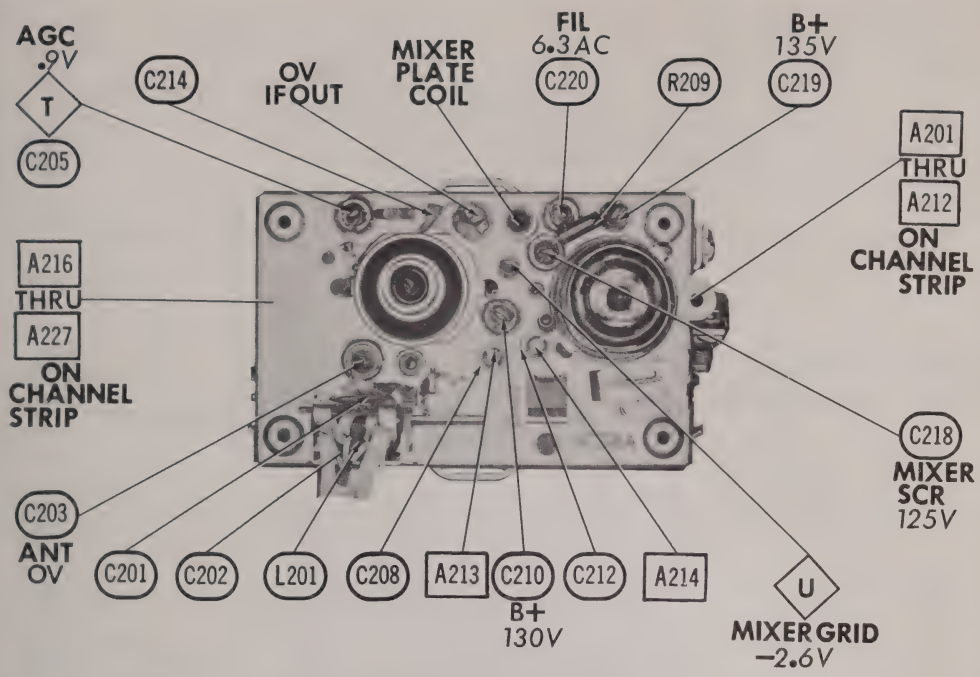
ITEM No.	RATING	REPLACEMENT DATA		REMARKS
		IRC PART No.	WORKMAN TV PART No.	
R201	47K			
R202	1000Ω			
R203	47Ω			
R204	4700Ω			
R205	220K			

ITEM No.	RATING	REPLACEMENT DATA		REMARKS
		IRC PART No.	WORKMAN TV PART No.	
R206	1000Ω			
R207	4700Ω			
R208	4700Ω			
R209	1000Ω			

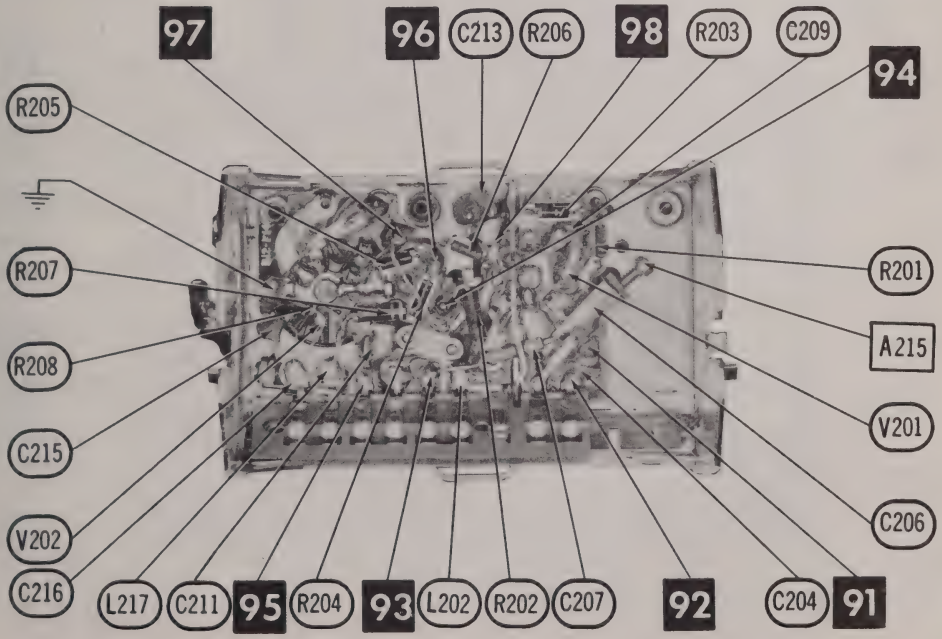
COILS (RF-IF)

ITEM No.	USE	ADMIRAL PART No.	NOTES
L201	Ant. Trans.	700B169	
L202A	Ant., RF, Mixer & Osc.	94E184-52	Channel 2
B	"	94E184-53	Channel 3
C	"	94E184-54	Channel 4
D	"	94E184-55	Channel 5
E	"	94E184-56	Channel 6
F	"	94E184-57	Channel 7

ITEM No.	USE	ADMIRAL PART No.	NOTES
L202G	Ant., RF, Mixer & Osc.	94E184-58	Channel 8
H	"	94E184-59	Channel 9
J	"	94E184-60	Channel 10
K	"	94E184-61	Channel 11
L	"	94E184-62	Channel 12
M	"	94E184-63	Channel 13



TUNER 94E184-11 - TOP VIEW

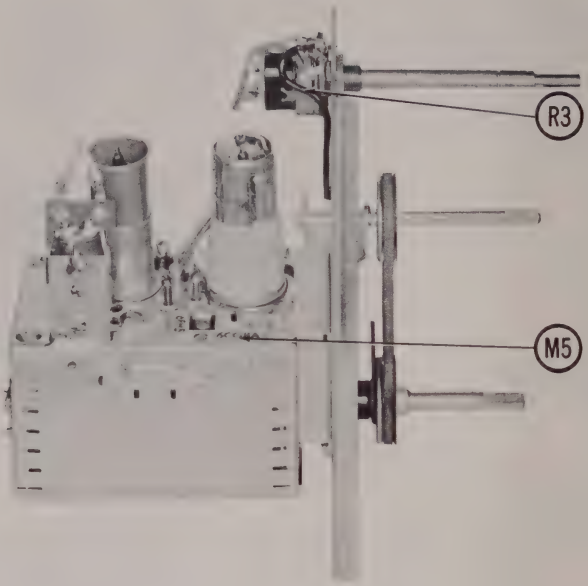


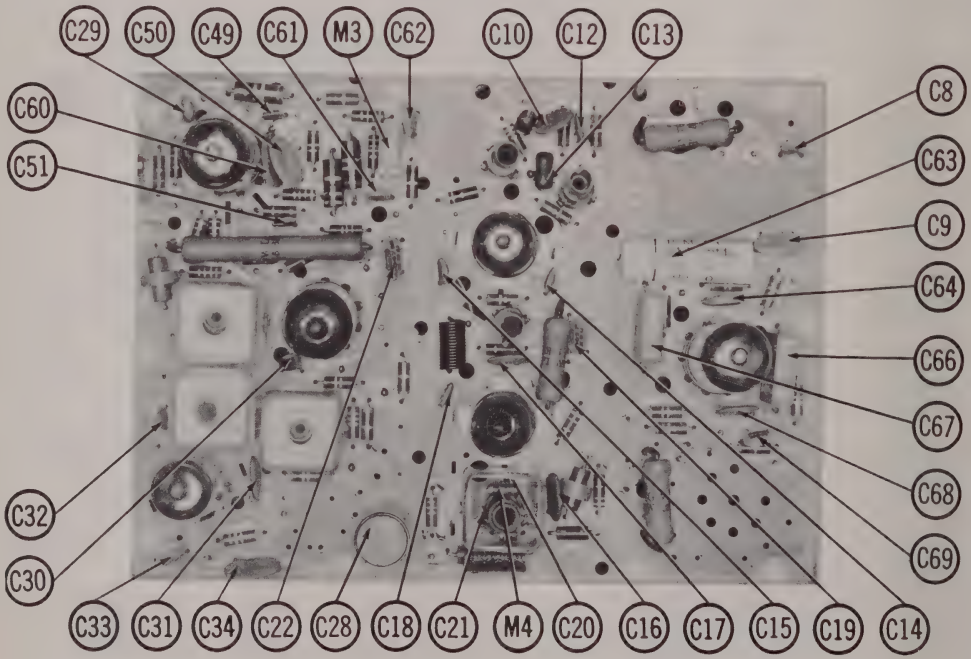
A Howard W. Sams CIRCUITRACE Photo

. ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

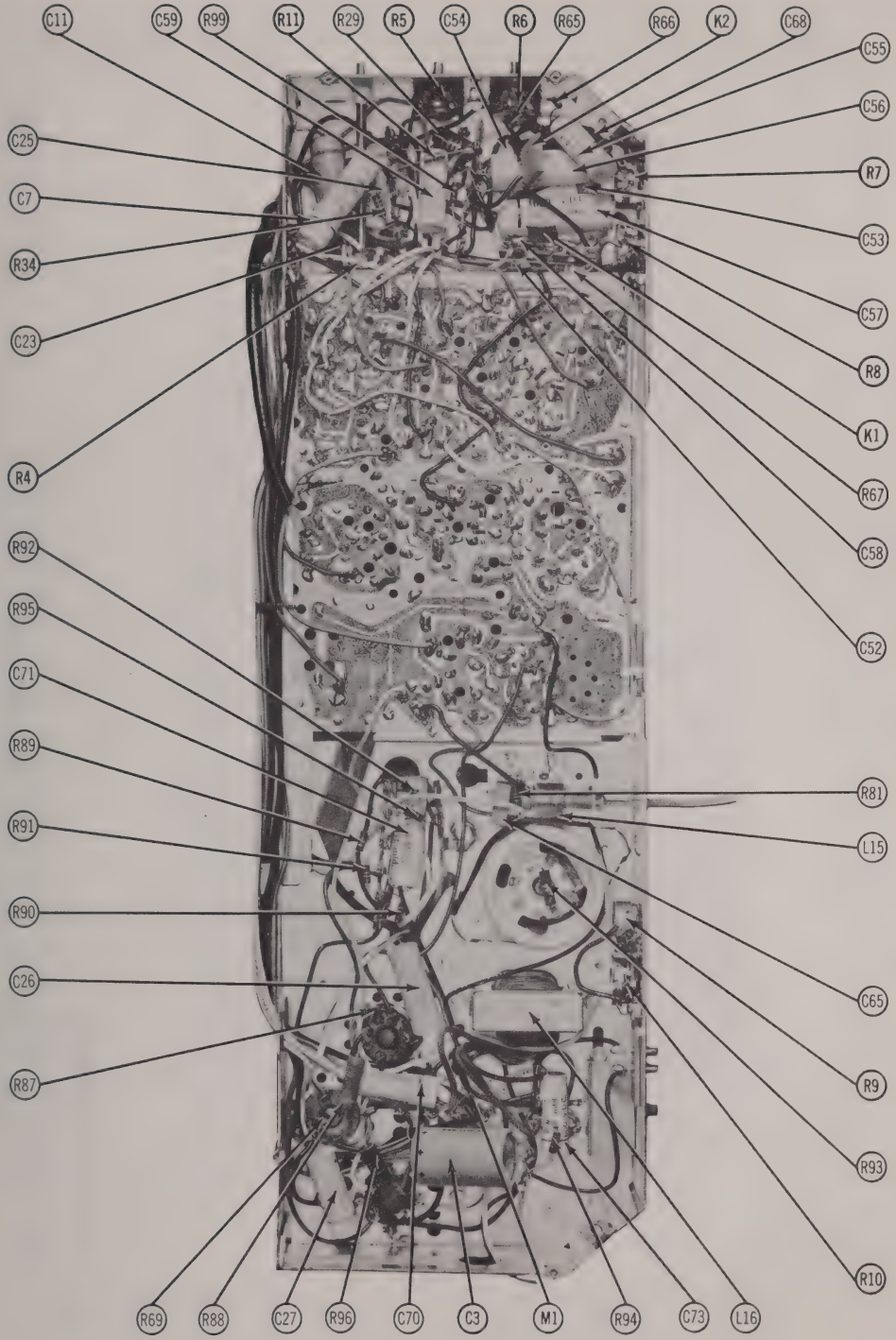
TUNER 94E184-11 - BOTTOM VIEW

CONTROL PANEL
VHF TUNER 94E184-11



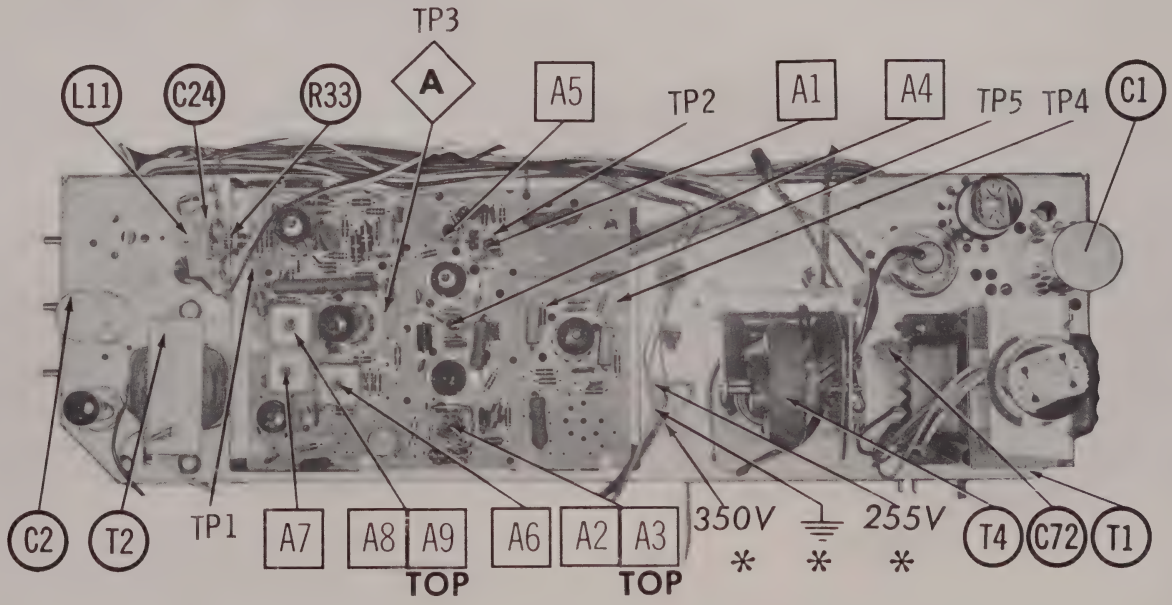


TV PRINTED BOARD CAPACITOR, MISC. IDENT.



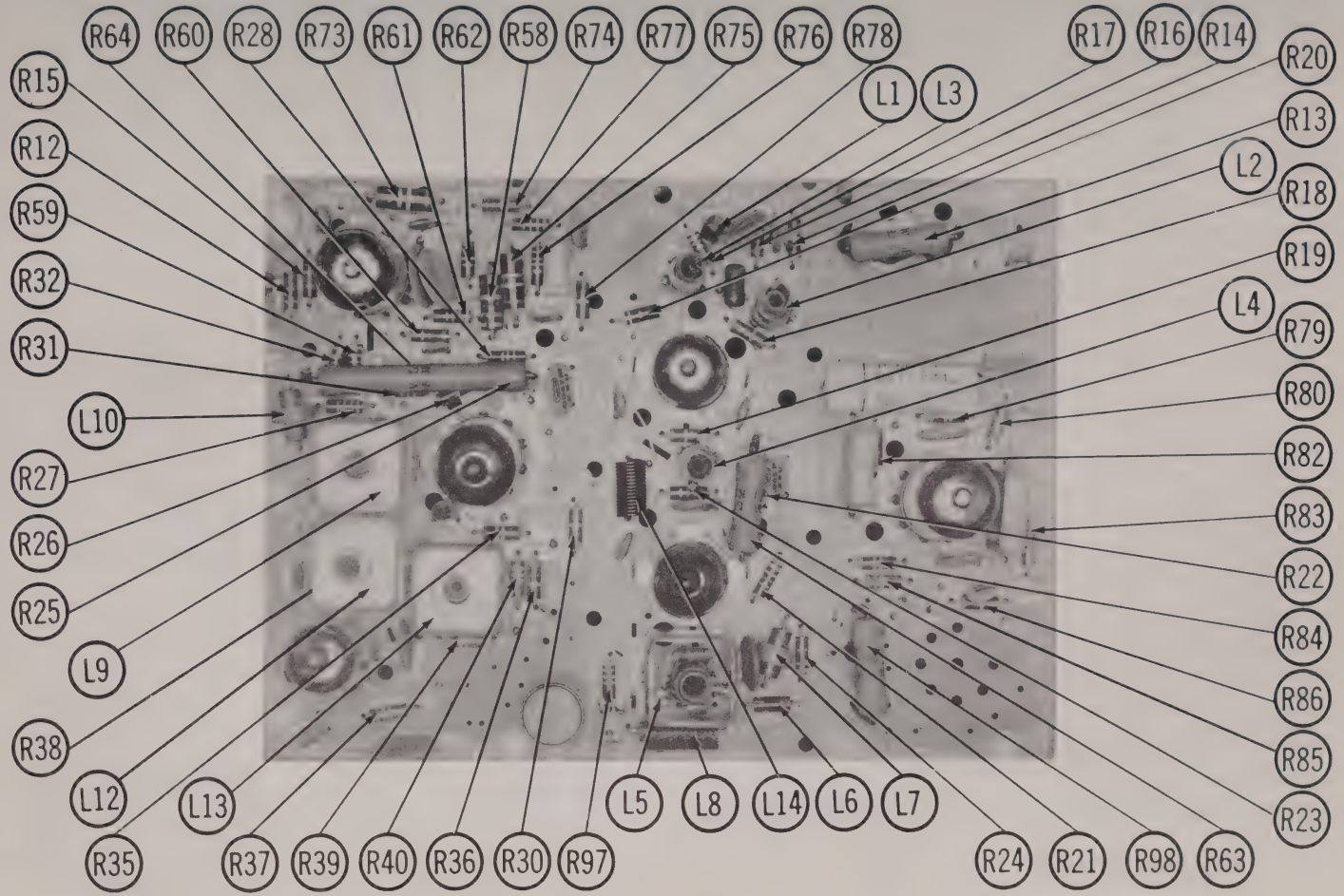
TV CHASSIS - BOTTOM VIEW

TP1	.9V	RF AGC	TP3	-.7V	VIDEO OUTPUT GRID
TP2	-.7V	IF AGC	TP4	235V	HORIZ LOCK COIL
			TP5	-.2V	HORIZ AFC GRID



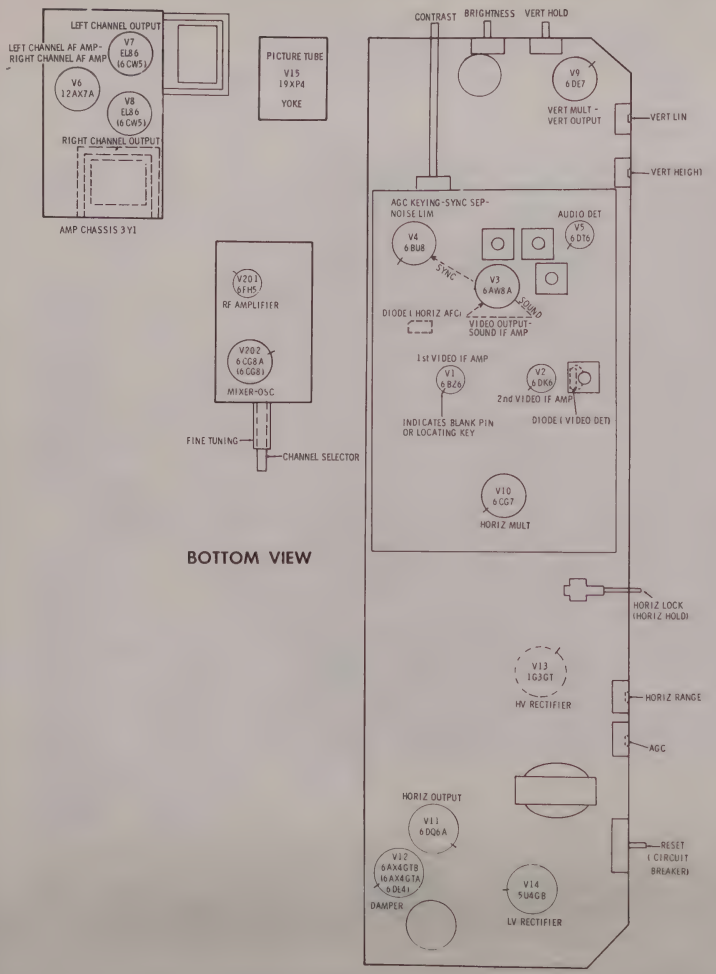
*FOCUS POINTS

TV CHASSIS - TOP VIEW



TV PRINTED BOARD - RESISTOR, INDUCTOR IDENT.

TUBE PLACEMENT CHART



RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	165K	43Ω	FIL	FIL	▪3900Ω	▪3900Ω	0Ω		
V2	6DK6	.1Ω	150Ω	FIL	FIL	▪470Ω	▪470Ω	0Ω		
V3	6AW8A	0Ω	100K	▪50K	FIL	FIL	0Ω	4700Ω	▪7000Ω	†4500Ω
V4	6BU8	▪0Ω	†7100Ω	1.9meg	FIL	FIL	• 25K	†1meg	†47K	†12meg
V5	6DT6	16Ω	560Ω	FIL	FIL	†280K	▪8200Ω	560K		
V6	12AX7A	†470K	3.3meg	1800Ω	FIL	FIL	†470K	3.3meg	1800Ω	FIL
V7	EL86	NC	470K	150Ω	FIL	FIL	NC	▪▲125Ω	NC	▪▲0Ω
V8	EL86	NC	500K	¶7000Ω ▲INF	FIL	FIL	NC	†395Ω ▲†175Ω	NC	†270Ω ▲†50Ω
V9	6DE7	†350Ω	NC	1.5meg	FIL	FIL	• †2.2meg	1meg	•300K	• 700Ω
V10	6CG7	†12K	2.2meg	1200Ω	FIL	FIL	†82K	•35K	1200Ω	0Ω
V11	6DQ6A	NC	FIL	NC	†15K	1meg	TP	FIL	0Ω	TOP CAP †10Ω
V12	6AX4GTB	TP	NC	700K	NC	†50Ω	NC	FIL	FIL	
V13	1G3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †380Ω
V14	5U4GB	NC	¶15K	NC	16Ω	NC	19Ω	NC	¶15K	
V15	19XP4	FIL	39K	†2.9meg	†100K	NC	NC	•200K	FIL	
V201	6FH5	47Ω	5meg	FIL	FIL	†9500Ω	0Ω	47Ω		
V202	6CG8A	4700Ω	▪5700Ω	0Ω	FIL	FIL	▪2000Ω	▪1000Ω	0Ω	225K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

ALL MEASUREMENTS MADE IN "TV" POSITION UNLESS OTHERWISE DESIGNATED.

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.

• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.

† MEASURED FROM PIN 8 OF V14.

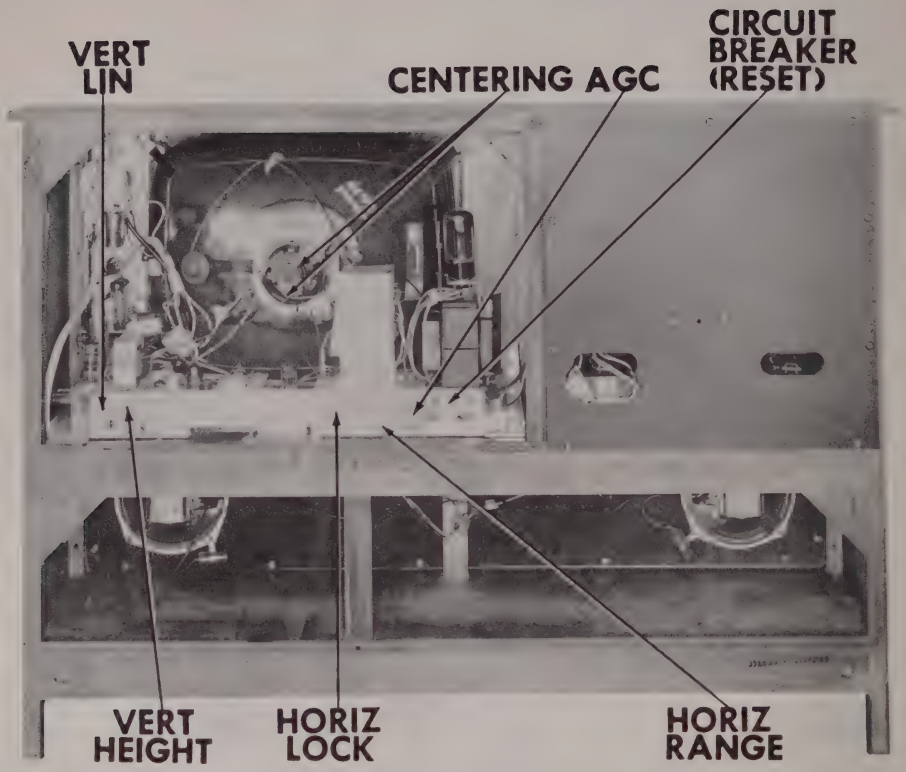
‡ MEASURED FROM PIN 3 OF V12.

▲ MEASURED IN "STEREO" POSITION.

▪ MEASURED FROM PIN 1 OF POWER SOCKET.

NC NO CONNECTION

TP TIE POINT



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Set the Horizontal Range Control to the center of its range.

Tune in a TV station and adjust the Horizontal Lock until the picture synchronizes horizontally.

Proper adjustment is indicated when it is possible to switch from one channel to another without the picture losing sync.

DISASSEMBLY INSTRUCTIONS

CHASSIS, PICTURE TUBE, FRONT ESCUTCHEON ASSEMBLY REMOVAL

1. Remove antenna leads.
2. Remove 10 wood screws holding rear cover. Remove rear cover.
3. Remove 3 knobs at side of cabinet.
4. Disconnect 2 phono plugs, phono power socket, and speaker socket.
5. Remove 2 bolts (inside top) holding front escutcheon structure.
6. Remove 6 chassis bolts.
7. Tilt top out and pull complete assembly out front.

PHOTOFACT® Folder

**TRAV-LER MODEL
23SP6095 (Ch. 1051-90)**

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

TRAV-LER MODEL
23SP6095 (Ch. 1051-90)

MODEL 23SP6095

TRAV-LER MODEL
23SP6095 (Ch. 1051-90)

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TRAV-LER MODEL 23SP6095 (Ch. 1051-90)

MODEL 23SP6095

TRADE NAME	Trav-Ler Model 23SP6095 (Chassis 1051-90)
MANUFACTURER	Trav-Ler Radio & Tele. Corp., 571 West Jackson Blvd., Chicago 6, Illinois
TYPE SET	Television Receiver (with Dual Channel Audio Amp), AM Tuner, & 4 Speed Automatic Record Changer *
TUBES	TV: VHF - Eighteen, AM Tuner: Two
POWER SUPPLY	110-120 Volts AC, 60 Cycle
RATING	TV with Dual Channel Audio Amp. (Function Selector Switch in TV position) - 210 Watts, 1.9 Amp. @ 117 Volts AC AM Tuner with Dual Channel Amp. (Function Selector Switch in Radio position) - 155 Watts, 1.35 Amp. @ 117 Volts AC Dual Channel Amp. (Function Selector Switch in Phono position) - 145 Watts, 1.25 Amp. @ 117 Volts AC (Less Phono Motor)
TUNING RANGE	TV - Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) AM Tuner - 540 to 1600KC (455KC IF)

* FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR UNIT - PHOTOFACT SET 465 FOLDER 6

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 2 screws holding the trim strip at the top edge of the safety glass. Tilt glass out and remove.

FUSE

A 3/4A fuse is used for LV supply protection. (For location, see "Tube Placement Chart".)

A fuse wire is used for filament protection. (For location, see M2 in photo "Chassis Bottom View - Align., Capacitor, Misc. Ident.").

TUNER OSCILLATOR ADJUSTMENT

To touch up VHF Oscillator, it is necessary to remove control panel.

AGC

The AGC may be varied by means of an AGC Control. (For location, see "Tube Placement Chart".)

FOCUS

The focus may be varied by connecting the lead from pin 6 of the picture tube to various voltage points. (For location, see photo "Cabinet - Rear View".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The Horizontal Frequency Slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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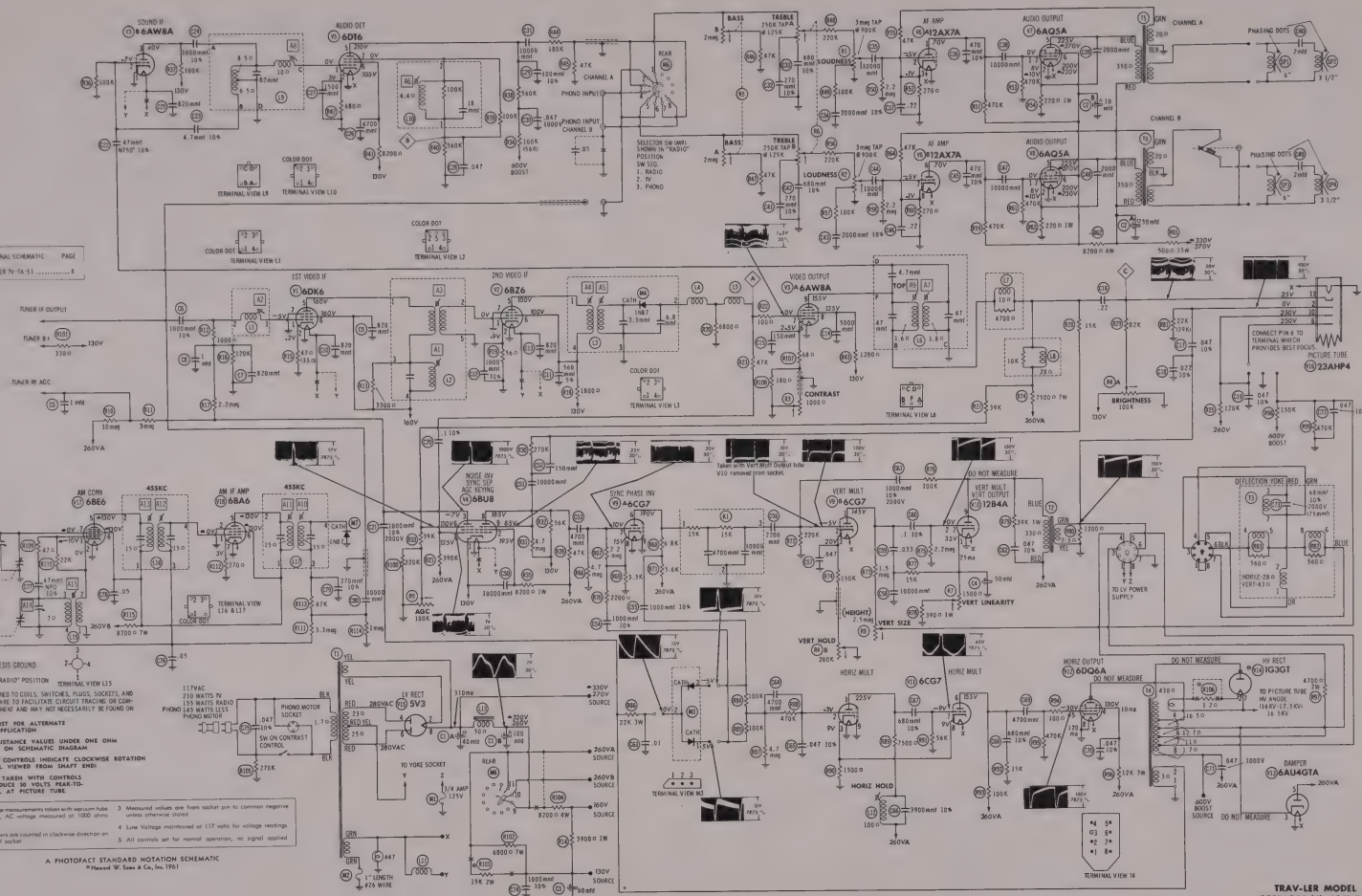
KC733

TRAV-LER MODEL 23SP6095 (Ch. 1051-90)

TRAV-LER MODEL 23SP6095 (Ch. 1051-90)

SET 541 FOLDER 2


TRAV-LER MODEL
23SP6095 (Ch. 1051-90)
ADDITIONAL SCHEMATIC PAGE
VHF TUNER TV-TA-51 8
TERMINAL VIEW L1
TERMINAL VIEW L2
TERMINAL VIEW L3
TERMINAL VIEW L6
TERMINAL VIEW L9
TERMINAL VIEW L10
TERMINAL VIEW L15
TERMINAL VIEW L16 & L17
TERMINAL VIEW M1
TERMINAL VIEW T4
* DENOTES CHASSIS GROUND
MEASURED IN "RADIO" POSITION
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1 DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC
*Howard W. Sams & Co., Inc. 1961
117VAC
210 WATTS TV
155 WATTS RADIO
PHONO 145 WATTS 1255
PHONO MOTOR
SW ON CONTRAST CONTROL
TO YOKE SOCKET
TRAV-LER MODEL
23SP6095 (Ch. 1051-90)

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: Al thru A9 ..... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
Mixer Plate Coil . GENERAL CEMENT #9296, 9297
WALSCO # 2546, 2547

VIDEO IF ALIGNMENT

Set Contrast fully clockwise.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Place a thin insulated metal strip between the Mixer-Osc. tube and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44MC (10MC Swp.)	41.25MC	Any non-interfering channel	Vert. Amp. thru 47K to point (A). Common to chassis. (Across Video Det. load.)	Al	Adjust to place marker in 41.25MC trap notch as in Fig. 1.
2.	"	"	42.75MC 45.75MC	"	"	Mixer Plate Coil & A2 thru A5	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Adjust Mixer Plate Coil and A2 for maximum gain, A3 and A4 to shape high frequency side of response curve and A5 to shape low frequency side.

SOUND IF ALIGNMENT

Connect an output meter across the speaker voice coil.
Connect the DC probe of the VTVM to point (B). Common to chassis. Tune in a strong air signal and adjust A6 for maximum output.
If two peaks occur, use the one resulting in the highest reading on the VTVM.
Reduce the signal strength by disconnecting the antenna. Adjust A7 and A8 for maximum undistorted sound. Further reduce the signal strength by moving the antenna lead further away. Retouch A7 and A8 for maximum undistorted sound.
Repeat the entire procedure if necessary.

4.5MC TRAP ALIGNMENT

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3.	High side thru .05mfd to point (A). Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	AC probe to point (C). Common to chassis. (Use 0-10 VAC scale.)	A9	Adjust for MINIMUM deflection.

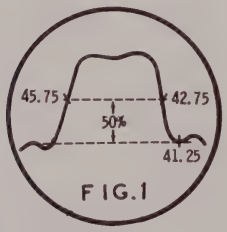
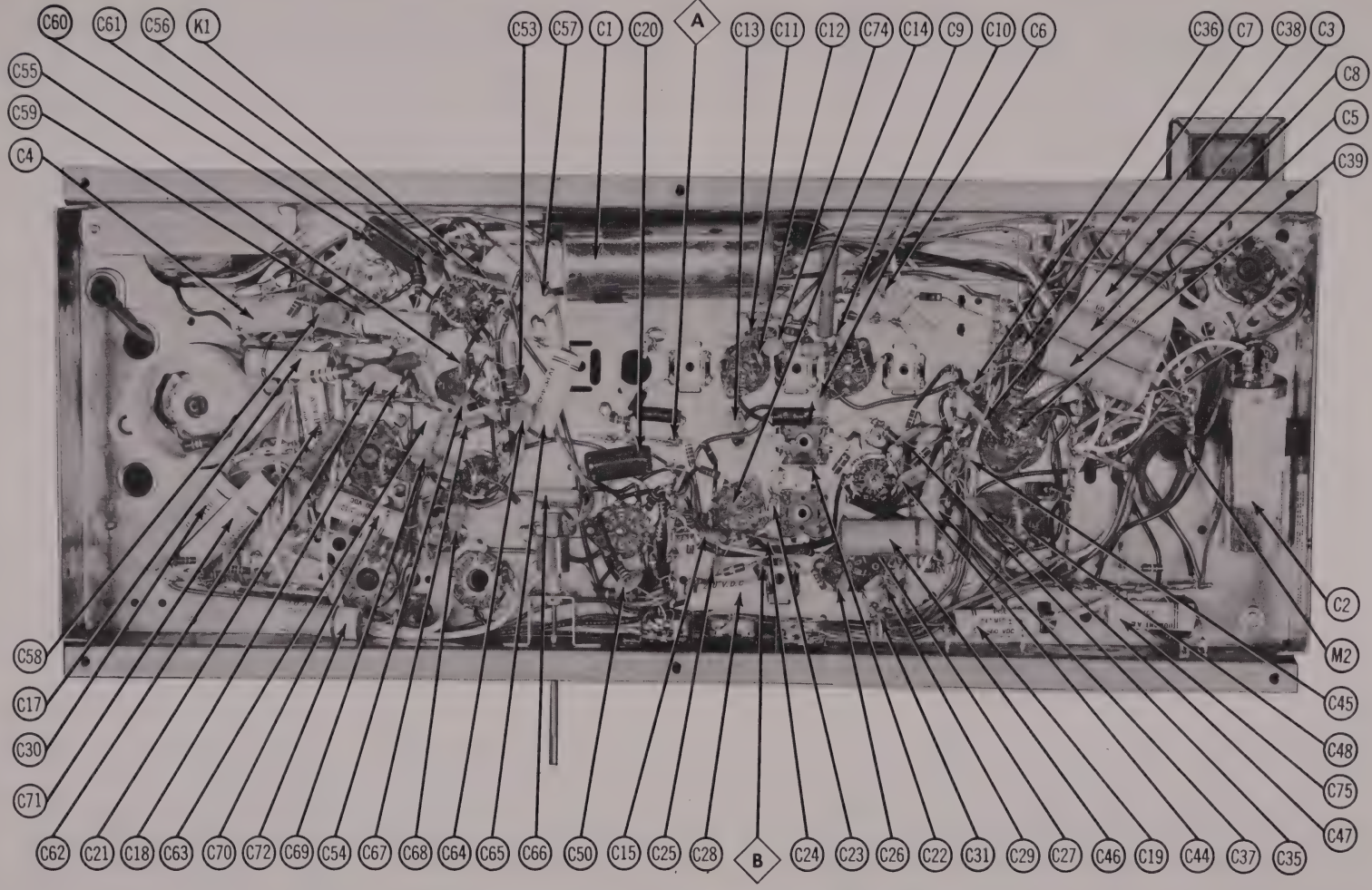
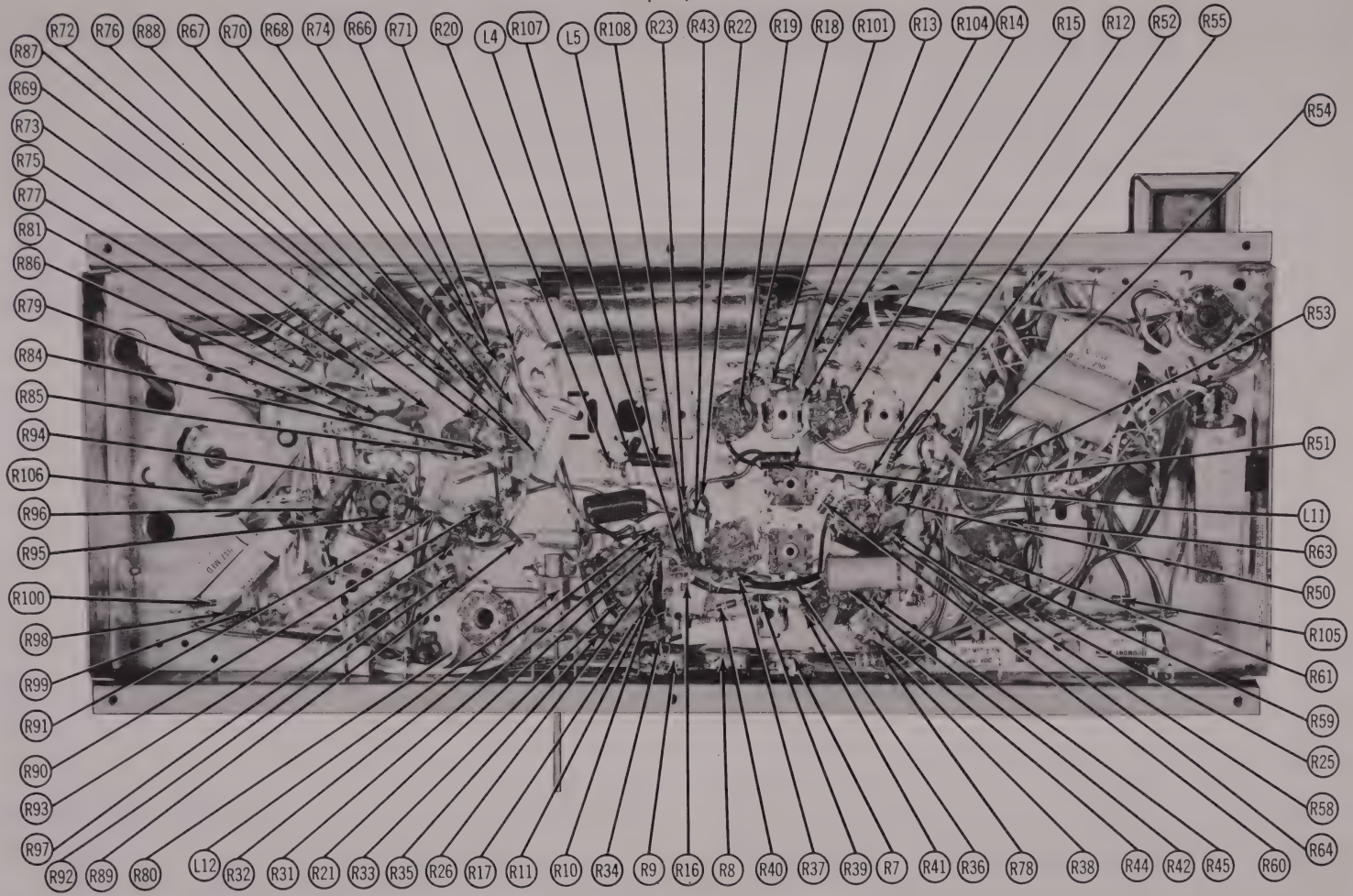


FIG.1



TV CHASSIS BOTTOM VIEW - ALIGN., CAPACITOR, MISC. IDENT.



TV CHASSIS BOTTOM VIEW - RESISTOR, INDUCTOR IDENT.

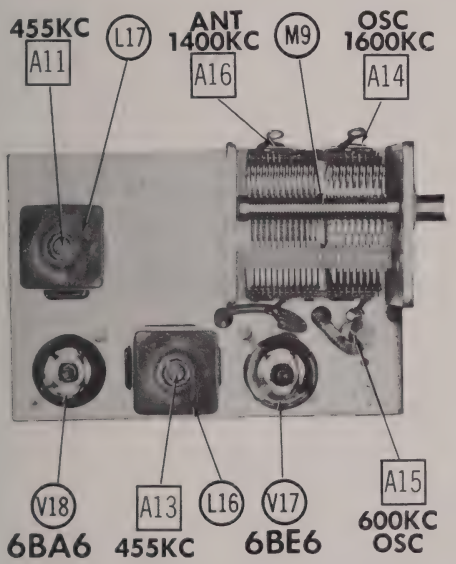
AM TUNER ALIGNMENT INSTRUCTIONS

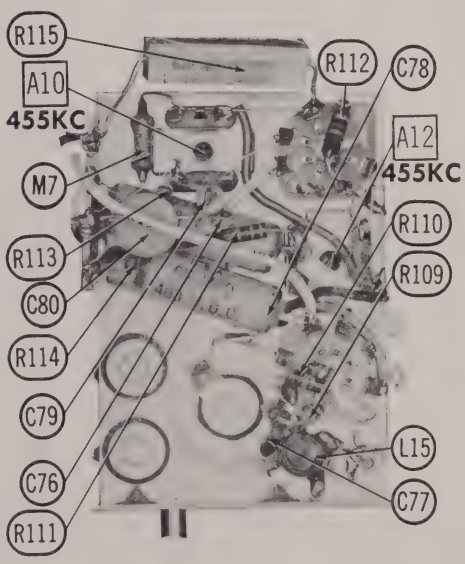
Loudness Controls should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A10 thru A13, A15 ... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532

A14, A16 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A10, A11, A12, A13	Adjust for maximum output.
2.	Loop	1600KC	1600KC	"	A14	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	600KC	600KC	"	A15	"
4.	"	1400KC	1400KC Signal	"	A16	Adjust for maximum output. Repeat steps 2, 3, 4.





AM TUNER

SET 541 FOLDER 2

TRAV-LER MODEL 23SP6095 (Ch. 1051-90)

FOLDER 2

VHF TUNER PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •			• RAYTHEON •		• SYLVANIA •
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amp.	6BN4A	V202	Mixer - Osc.	6CG8

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

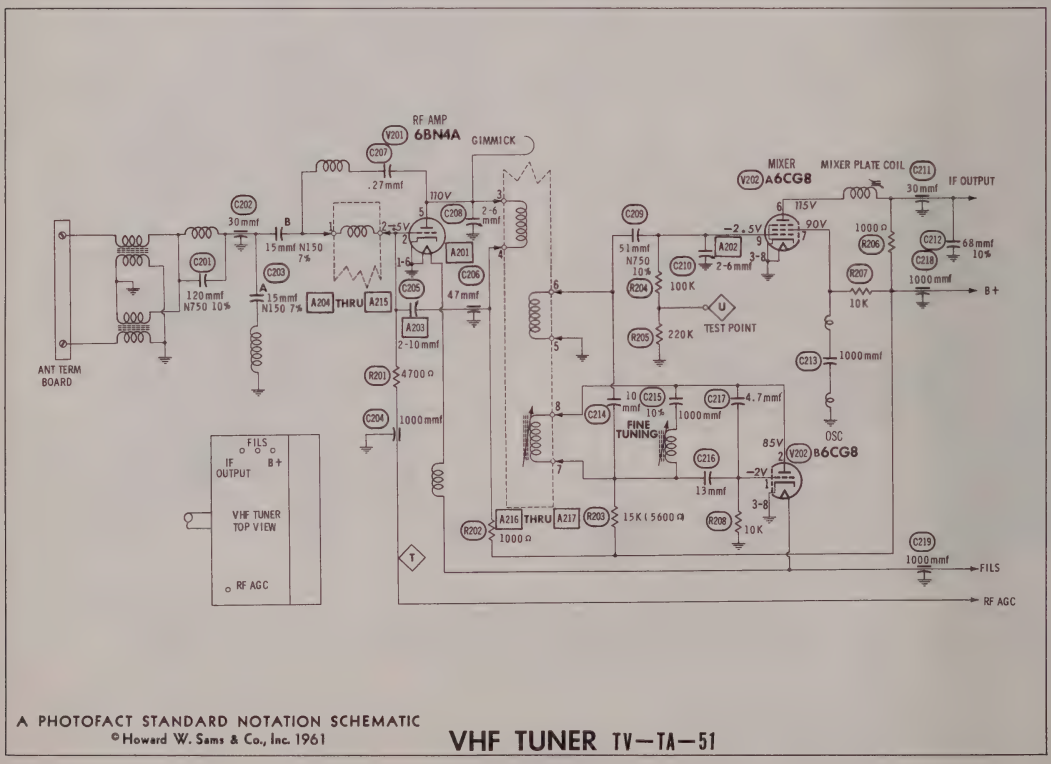
ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	120 N750 10%			TCN-120	C10T12U	CCTN-121	CN7-312	10TCU-T12
C202	30							
C203A	15 N150 7%					*		10TCP-Q15
B	15 N150 7%					*		10TCP-Q15
C204	1000		EF-001	MFT-1000		CCF-102	CT280A	
C205	2-10			829-10				
C206	47							
C207	.27							
C208	2-6			829-6		CV-3	CT565	
C209	51 N750 10%			TCN-51	C10Q51U			
C210	2-6			829-6		CV-3	CT565	
C211	30							
C212	68 10%		NPO-SI 68	D6-680	L10Q68	CCD-680	GP468	10TS-Q68
C213	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C214	10 10%		NPO-SI 10	D6-100	L10Q10	CCD-100	GP410	10TS-Q10
C215	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C216	13			TCZ-12	C10Q13C	CCTO-120	CNO-412	10TCC-Q12
C217	4.7		NPO-DI 4.7	DTZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C218	1000		EF-001	MFT-1000		CCF-102	CT280A	
C219	1000		EF-001	MFT-1000		CCF-102	CT280A	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R201	4700Ω				R205	220K			
R202	1000Ω				R206	1000Ω			
R203	15K			(5600Ω) *	R207	10K			
R204	100K				R208	10K			

* Alternate Value



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VHF TUNER TV—TA—51

VHF TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A203 ..... GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537
A216 thru A227 ..... GENERAL CEMENT #8282, 8606, 8606L, 9091
WALSCO #2526, 2541, 2542, 2543, 2544

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect the negative lead of a 4.5 volts bias supply to point ⓘ. Positive to chassis.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point ⓘ. Low side to chassis.	A201 A202 A203	Adjust A201 and A202 for maximum amplitude and symmetry with markers as shown in Fig. 201. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A203 to obtain MINIMUM response on the scope.
2.	Two 120Ω Carbon resistors	"	213MC	211.25MC 215.75MC	13	"	A204	Adjust for maximum amplitude of response similar to Fig. 201. Adjust by expanding or compressing coil turns.
			207MC	205.25MC 209.75MC	12		A205	
			201MC	199.25MC 203.75MC	11		A206	
			195MC	193.25MC 197.75MC	10		A207	
			189MC	187.25MC 191.75MC	9		A208	
			183MC	181.25MC 185.75MC	8		A209	
			177MC	175.25MC 179.75MC	7		A210	
			85MC	83.25MC 87.75MC	6		A211	
			79MC	77.25MC 81.75MC	5		A212	
			69MC	67.25MC 71.75MC	4		A213	
			63MC	61.25MC 65.75MC	3		A214	
			57MC	55.25MC 59.75MC	2		A215	

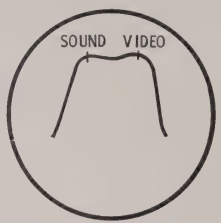


FIG. 201

OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. -load.	A216	Adjust to place sound marker in trap notch as in Fig. 202. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A217	
			201MC	199.25MC 203.75MC	11		A218	
			195MC	193.25MC 197.75MC	10		A219	
			189MC	187.25MC 191.75MC	9		A220	
			183MC	181.25MC 185.75MC	8		A221	
			177MC	175.25MC 179.75MC	7		A222	
			85MC	83.25MC 87.75MC	6		A223	
			79MC	77.25MC 81.75MC	5		A224	
			69MC	67.25MC 71.75MC	4		A225	
			63MC	61.25MC 65.75MC	3		A226	
			57MC	55.25MC 59.75MC	2		A227	

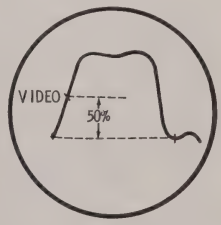


FIG. 202

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No	GENERAL ELECTRIC / RAYTHEON / SYLVANIA — USE	TYPE
V1	1st Video IF Amplifier	6DE8
V2	2nd Video IF Amplifier	6BZ6
V3	Video Output - Sound IF Amp.	6AW8A
V4	AGC Keying - Sync Sep. - Noise Limiter	6BU8
V5	Audio Detector	6DT6
V6	Channel A AF Amp. - Channel B AF Amp.	12AX7A
V7	Channel A Output	6AQ5A
V8	Channel B Output	6AQ5A
V9	Sync Phase Inverter - Vert. Mult.	6CGT
V10	Vert. Mult. - Vert. Output	12BH4
V11	Horiz. Mult.	6CGT
V12	Horiz. Output	6DQ6A
V13	Damper	6AU4GTA
V14	HV Rectifier	1G3GT (1G3/1B3GT) *
V15	LV Rectifier	5V3

* Alternate

PICTURE TUBE

ITEM No.	REPLACEMENT DATA: TRAV-LER PART No.	GENERAL ELECTRIC PART No	RCA PART No	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
V16	23AHP4		23AHP4 ①		23AHP4 ②	① Aluminized ② Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: TRAV-LER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	40	350	EC-115	AFH3-64-25	BO463	FP347	TMD-2700	TVL-2780	
B	100	350							
C2A	50	350	EC-116A	AFH3-26-50	A0390	FP230.5	TMS-1630	TVL-1622	
B	10	350			BR1045		TMD-0-450	TVA-1504	
C3	60	200	EC-131	PRS590	BR6025	TC68	TD-60-250	TVA-1513	
C4	50	50	EC-130	PRS550	BR505	TC39	TD-50-50	TVA-1308	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	1.0 100V		P288N-1.0		CUB2W1	1DP-5-105	GEM-2I	2TM-M1
C6	1000 10%		DI-1000	DD-102	SR5I1	CCD-102	GP2I0	10TS-D10
C7	820		DI-820	DD-82I	BYA10T82	CCD-82I	B-382	10TS-T82
C8	1.0 100V		P288N-1.0		CUB2W1	1DP-5-105	GEM-2I	2TM-M1
C9	820		DI-820	DD-82I	BYA0T82	CCD-82I	B-382	10TS-T82
C10	820		DI-820	DD-82I	BYA10T82	CCD-82I	B-382	10TS-T82
C11	580 5%		SR5T58		CM-15B-580J	MCJ247		MS-3I5
C12	1000 10%		DI-1000	DD-102	PM6I1	CCD-102	GP2I0	10TS-D10
C13	820		DI-820	DD-82I	BYA10T82	CCD-82I	B-382	10TS-T82
C14	5000		BPD-005	DD-502	BYA0D6	CCD-502	B-280	5HK-D50
C15	150		DI-150	DD-151	L10T15	CCD-151	B-315	10TS-T15
C16	.22 400V		P488N-22		CUB4P22	4DP-5-224	GEM-6022	4TM-P22
C17	.047 600V 10%		V84C5847-10%		PM6S47	6DP-3-473	GEM-1615	6TM-S47
C18	.033 600V 10%		V84C5833-10%		PM6S33	6DP-3-223	GEM-1613	6TM-S22
C19	.047 600V 10%		V84C5847-10%		PM6S47	6DP-3-473	GEM-1615	6TM-S47
C20	.1 600V 10%		V84C5P1-10%		PM6P1	6DP-4-104	GEM-1001	6TM-P10
C21	1000 3000V 10%							
C22	47 NT50 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C23	4.7	10%	NPO-SI 4.7	TCZ-4R7	C10Y47C	CCTO-4R7	CNO-347	10TCC-Y47
C24	1000	10%	DI-1000	DD-103	SR5I0	CCD-103	GP3I0	10TS-D10
C25	820		DI-820	DD-82I	BYA10T82	CCD-82I	B-382	10TS-T82
C26	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-347	5HK-D47
C27	1500		BPD-005	DD-152	BYA10D15	CCD-152	B-315	5HK-D15
C28	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C29	100	10%	DI-100	DD-101	L10T1	CCD-101	GP3I0	10TS-T10
C30	.047 1000V		P108N-047		CUB10S47	16DP-5-473	GEM-10147	10TM-S47
C31	10000		BPD-01	DD-103	BYA10E	CCD-103	B-110	5HK-S10
C32	270	10%	DI-270	DD-271	L10T27	CCD-271	GP33T	10TS-T27
C33	680	10%	DI-680	DD-681	L10T27	CCD-681	GP36S	10TS-T68
C34	3000	10%	DI-3000		PM6D3	CCD-302	GP33S	10TS-D30
C35	10000		BPD-01	DD-103	BYA10E	CCD-103	B-110	5HK-S10
C36	470	10%	DI-470	DD-471	SR5T47	CCD-471	GP34T	10TS-T47
C37	.22 500V		P688N-22		CUB5P22	5DP-5-224	GEM-6022	5TM-P22
C38	10000		BPD-01	DD-103	BYA10E	CCD-103	B-110	5HK-S10
C39	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C40	2mfd 50V		M22W2		M22W2			
C41	270	10%	DI-270	DD-22I	L20T27	CCD-271	GP33T	10TS-T27
C42	680	10%	DI-680	DD-68I	L20T27	CCD-681	GP36S	10TS-T68
C43	3000	10%	DI-3000		PM6D2	CCD-302	GP33O	10TS-D20
C44	10000		BPD-01	DD-103	BYA10E	CCD-103	B-110	5HK-S10
C45	470	10%	DI-470	DD-47I	SR5T47	CCD-471	GP34T	10TS-T47
C46	.22	600V	P688N-22		CUB6P22	6DP-5-224	GEM-6022	6TM-P22
C47	10000		BPD-01	DD-103	BYA10E	CCD-103	B-110	5HK-S10
C48	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C49	2mfd 50V		M22W2		M22W2			
C50	10000		BPD-01	DD-103	BYA10E	CCD-103	B-110	5HK-S10
C51	10000		BPD-01	DD-103	BYA10E	CCD-103	B-110	5HK-S10
C52	150		DI-150	DD-151	L10T15	CCD-151	B-315	10TS-T15
C53	4700		BPD-0047	DD-472	BYA10D47	CCD-472	B-347	5HK-D47
C54	1000	10%	DI-1000	DD-102	SR5I1	CCD-102	GP2I0	10TS-D10
C55	1000	10%	DI-1000	DD-102	SR5I1	CCD-102	GP2I0	10TS-D10
C56	2200		BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C57	.047 300V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C58	10000		BPD-01	DD-103	BYA10E	CCD-103	B-110	5HK-S10
C59	.033 600V		P688N-033	DD-303	CUB6S33	6DP-3-333	GEM-6133	6TM-S33
C60	.1 600V		V84C5P1-10%		PM6P1	6DP-4-104	GEM-1001	6TM-P10
C61	1000 2000V	10%						
C62	.047 600V	10%	V84C5847-10%		PM6S47	6DP-3-473	GEM-1615	6TM-S47
C63	.01 600V		P688N-01	DS-103	CUB6S1	6DP-2-103	GEM-611	6TM-S10
C64	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-347	5HK-D47
C65	.047 600V	10%	V84C5847-10%		PM6S47	6DP-3-473	GEM-1615	6TM-S47
C66	3900	10%	1484-0039		1R5D39	CM-20B-392K	MCJ462.5	MS-339
C67	680	10%	1489-00068		5RST68	CM-19B-681K	MCJ249	MS-368
C68	680	10%	1489-00068		5RST68	CM-19B-681K	MCJ249	MS-368
C69	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-347	5HK-D47
C70	.047	600V 10%	V84C5847-10%		PM6S47	6DP-3-473	GEM-1615	6TM-S47

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C71	.047 1000V		P108N-047		CUB10S47	16DP-5-473	GEM-10147	10TS-S47
C72	.047 1000V		P108N-047		CUB10S47	16DP-5-473	GEM-10147	10TS-S47
C73	68 2000V 10%	(75) †			HVA20Q68	VCM-20-681K	2DY-468	
C74	1000 10%		DI-1000	DD-102	M64C6847-10%	CCD-102	GP2I0	10TS-D10
C75	.047 600V 10%		V84C6847-10%		PM6S47	6DP-3-473	GEM-1615	6TM-S47

† Alternate Value

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: TRAV-LER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	3meg *	½	VC-234			Q3I-140X	UT-457	Loudness, Channel A
R2	3meg *	½	VC-234			Q3I-140X	UT-457	Loudness, Channel B
R3A	1000Ω	½	VC-231			B1T-108	PP13R	Contrast
B	Switch					SK7	Not Req.	Power Off-On
R4A	100K	½	VC-230	F1-31				Brightness
B	200K	½		R2-33	(RTV-727	(Q1-1542	■(UR42R8	Vert. Hold
R5A	2meg	½	VC-233	R-75	AD47-2meg-8		FA3EL	Bass, Channel B
B	2meg	½		Not Req.	Not Req.		RU3EL	Bass, Channel A
C	Shaft			Not Req.	KSB-3		CS3500	
R6A	250K **	½	VC-232	BT-56			FA3541T253	Treble, Channel B
B	250K **	½		STR-56			RU254T1253	Treble, Channel A
C	Shaft			Not Req.			CS3500	
R7A	1500Ω	½	VC-85A	TT-311	B47-1500-B	B1I-109	PTA152L	Vert. Linearity
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	
R8	2.5meg	½	VC-78	BX-83	B47-2.5meg-S	HLC3	RU-585	Vert. Size (Height)
R9A	100K	½	VC-84	TT-40	B47-100K-B	B1I-128	PTA15L	AGC
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	

† "CONCENTRIKIT" Equivalent: K-6 Kit with Base Elements and Shafts: B1I-138, P17-206 (Panel) (Not available as a factory assembled unit). B1I-139, RI-220 (Rear)

■ "STA-LOC" Equivalent: FA15L, RU35L, CF2250, 182750.

* Tap ② 900K. ** Tap ② 125K.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA: IRC PART No.	WORKMAN TV PART No.	REMARKS
R10	10meg			
R11	3meg			
R12	1000Ω			(33Ω) *
R13	3300Ω			
R14	39000Ω 1W			
R15	47Ω			
R16	120K			
R17	2.2meg			
R18	1800Ω			
R19	56Ω			
R20	6800Ω			
R21	390K			
R22	100Ω			
R23	47K			
R24	7500Ω 7W	PW7-7500	10W-SQ-7500	
R25	120K			
R26	47K			
R27	39K			
R28	15K			
R29	82K			
R30	270K			
R31	4.7meg			(56K) *
R32	56K			
R33	39K			
R34	100K			(56K) *
R35	6200Ω 1W			
R36	100K			
R37	100K			
R38	56K			
R39	100K			
R40	560K			
R41	8200Ω			
R42	680Ω			
R43	1200Ω			
R44	180K			
R45	47K			
R46	47K			
R47	47K			
R48	220K			
R49	100K			
R50	2.2meg			
R51	470K			
R52	270Ω			
R53	470K			
R54	220Ω 1W			
R55	47K			
R56	220K			
R57	100K			
R58	2.2meg			
R59	470K			

* Alternate Value

Note 1. May not be used in some versions.

ITEM No.	RATING	REPLACEMENT DATA: IRC PART No.	WORKMAN TV PART No.	REMARKS
R60	270Ω			
R61	470K			
R62	8200Ω 4W	PW5-8200	7W-SQ-8200	
R63	220Ω 1W			
R64	47K			
R65	560Ω 15W	PW15-560	15W-SQ-560	
R66	4.7meg			
R67	2.2meg			
R68	6800Ω			
R69	3300Ω			
R70	22090			
R71	5600Ω			
R72	220K			
R73	1.5meg			
R74	150K			
R75	2.2meg			
R76	100K			
R77	15K			
R78	390Ω 1W			
R79	39K 1W			
R80	1200Ω			
R81	22K			(39K) *
R82	560Ω			
R83	560Ω			
R84	100K			
R85	100K			
R86	22K 3W	PW3-22K	3G-22K	
R87	4.7meg			
R88	470K			
R89	7500Ω			
R90	1500Ω			
R91	56K			
R92	15K			
R93	100K			
R94	100Ω			
R95	470K			
R96	12K 3W	PW3-12K	3G-12K	
R97	4700Ω 2W			
R98	150K			
R99	470K			
R100	220K			
R101	330Ω			
R102	6800Ω 7W	PW7-6800	7W-SQ-6800	
R103	15K 2W			Note 1
R104	8200Ω 4W	PW5-8200	7W-SQ-8200	
R105	270K			
R106	1.2Ω			Note 1
R107	88Ω			
R108	180Ω			

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	TRAV-LER PART No.	REPLACEMENT DATA
K1	Vert. Integrator	4700mmf, 10000mmf, 15K, 15K	CC-120	Centralab PC-392

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	NOTES
L1	1st Video IF	L-150	TV-126 *	6231 *	RTC-8558 *	T208 *	① Wound on 4700Ω Resistor.
L2A	2nd Video IF	L-103	TV-127	6232	RTC-8559	T209	② Wound on 10K Resistor.
B	41.25MC Trap						③Includes 100K Resistor, 18mmf Capacitor.
L3	4th Video IF	L-152				T276	
L4	RF Choke (10uh)	L-160	BC-566	4612	RTC-8522	T860	* Disregard Secondary.
L5	RF Choke (37uh)	L-158	TV-192	4515	RTC-8525	T863	† Paired with 4700Ω Resistor.
L6A	4.5MC Trap	L-154		1492 IFT	RTC-9056	T253	
B	1st Sound IF						▲ Paired with 10K Resistor.
L7	Peaking (180uh)	L-162 ①	TV-184 †	6180 †	RTC-8597 †	T310 †	
L8	Peaking (950uh)	L-163 ②	TV-208 ▲	6157 ▲	RTC-8596 ▲	T329 ▲	■ Paired with 100K Resistor.
L9	2nd Sound IF	L-167					
L10	Quadrature	L-110A③	TV-154 ■	1481 ■	RTC-8606 ■	T248 ■	
L11	Fil. Choke (1.8uh)	L-164	BC-562	4504	RTC-8516	T856	

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	Merit PART No.	Miller PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	Workman TV PART No.
L12	Horiz. Stabilizer	L-156	TV-163	6210	RC110	RTC-8622	HS-5	WLC-35	T103

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: TRAV-LER PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
L13	.230A	50Ω	1.1 Hy.	FC-5	C-2096	C-2343	26C44	C-34X	

TRANSFORMER (POWER)

ITEM No.	RATING: PRI	SEC 1	SEC 2	SEC 3	SEC 4	SEC 5	REPLACEMENT DATA: TRAV-LER PART No	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	117V ① 1.8A	560VCT ② 310A DC	5V ③ 3.8A	6.3V ③ 9A			TR-63					

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	Merit PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	Vert. Output	TR-36B	A-3823	VO-34	A-8143	26S53	A-108X	
T3	Yoke (Horiz.19MH) (925) (Vert. 42MH) Rear Cover and Centering Device	L-178	MDF-92 ①②	PCM-2045 ①②	DY-18A ①②	Y-16 ①	Y-41 & YW3 ②	
T4	Horiz. Output	TR-53	HVO-54 *	FFR-173 *	A-8255 *	FLY-76 *	D-15IR *	

① Use original rear cover and centering device. Use original damping network, if necessary.
② Add fifth lead and connect same as original.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

ORIGINAL TERMINAL CONNECTIONS	Merit Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4	8	8	5	5	4
5	4	4	4	4	5
6	NC See Note③	NC See Note③	NC See Note③	NC See Note③	3
7	2	2	2	2	7 *
8	1	1	1	1	8
2	7	7	7	7	2
1	8	8	8	8	1
Special Notes	③④	③④	②④	③④	

③ Remove Resistor, R 97, Capacitor, C73, and Yoke Center Tap Lead from Circuit. Requires new damping network consisting of 1500 ½ watt Resistor and 82mmf ② 2KV Capacitor connected in series. Install damping network across horizontal yoke terminals 43 and 47.
④ Remove one turn from filament winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: TRAV-LER PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	4500Ω	1.5-3Ω	AT-47					
		SEC. 2						
		8Ω						
		SEC. 1						
T6	4500Ω	1.5-3Ω	AT-47					
		SEC. 3						
		8Ω						

TRAV-LER MODEL 23SP6095 (Ch. 1051-90)

FOLDER 2

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TRAV-LER PART No.	QUAM PART No.	
SP1	6"	PM	3-4Ω	SPK-62	6A31	
SP2	3½"	PM	3-4Ω	SPK-28	3A15TZ4.7	
SP3	6"	PM	3-4Ω	SPK-62	6A31	
SP4	3½"	PM	3-4Ω	SPK-28	3A15TZ4.7	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			TRAV-LER PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	N	3/4A 125V S/B			333.750 (N3/4A 125V S/B)	346010	N 3/4	HN 1/2 to 3/4
M2	1"	length #26 wire						

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		TRAV-LER PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M3	1N87 †	SR15 *	6GD1 *	1N87 †	1N87 †	* Dual Selenium, Series Connected † Video Detector
M4						

MISCELLANEOUS

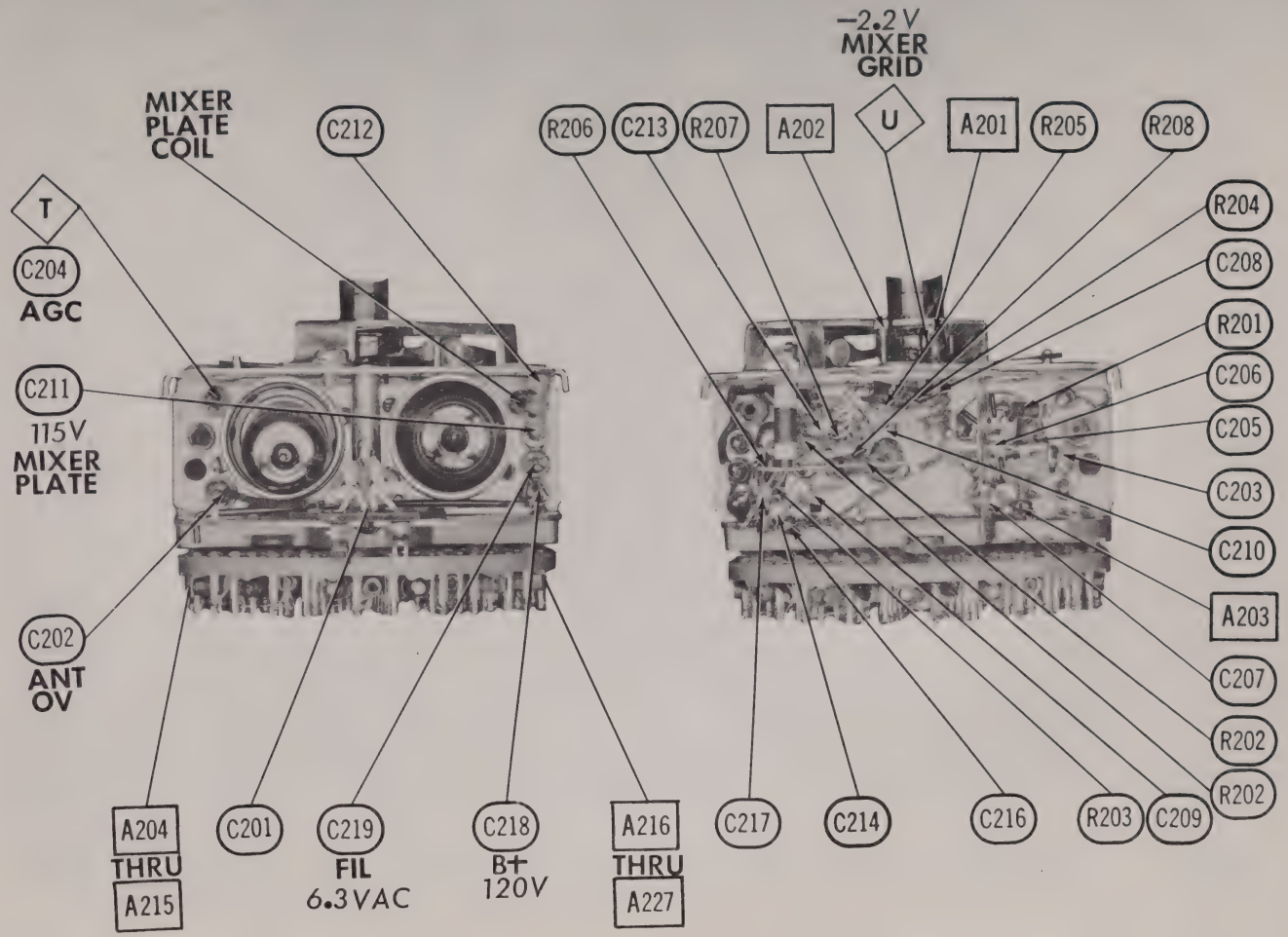
ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
M5	Tuner	TV-TA-51	VHF
M6	Switch		Function Selector - Rotary

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor



VHF Tuner TV-TA-5l

TRAV-LER MODEL
23SP6095 (Ch. 1051-90)

FOLDER 2

PAGE 13

AM TUNER PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •			RAYTHEON •		SYLVANIA •
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V17	AM Converter	6BE6	V18	AM IF Amplifier	6BA6

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C76	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C77	47 NPO 10%		NPO-DI 47	DTZ-47	C10Q47C	CCTO-470	CNO-447	10TCU-Q47
C78	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C79	270 10%		DI-270	DD-271	L10T27	CCD-271	GP327	10TS-T27
C80	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R109	47Ω				R113	47K			
R110	22K				R114	1meg			
R111	3.3meg				R115	8200Ω 7W	PW7-8200	7W-SQ-8200	
R112	270Ω								

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		TRAV-LER PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L14	Loopstick	LL-60	BC-419	705-A		T532	
L15	Osc.	LO-26	BC-393	71-OSC	RTC-8648	T502	
L16	Input IF	LI-19	BC-352	12-C1	RTC-8632	T607	
L17	Output IF	LI-19	BC-353	12-C2	RTC-8633	T608	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		TRAV-LER PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M7	1N87 †			1N87 †	1N87 †	† AM Detector (Pigtail)

PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	REPLACEMENT DATA								NOTES
	TRAV-LER PART No.		ASTATIC PART No.		ELECTRO-VOICE PART No.		SONOTONE PART No.		
	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	
M8			70-TS-TB	N8-3 N8-7	96T	Not Req.	12TH-S	Not Req.	

MISCELLANEOUS

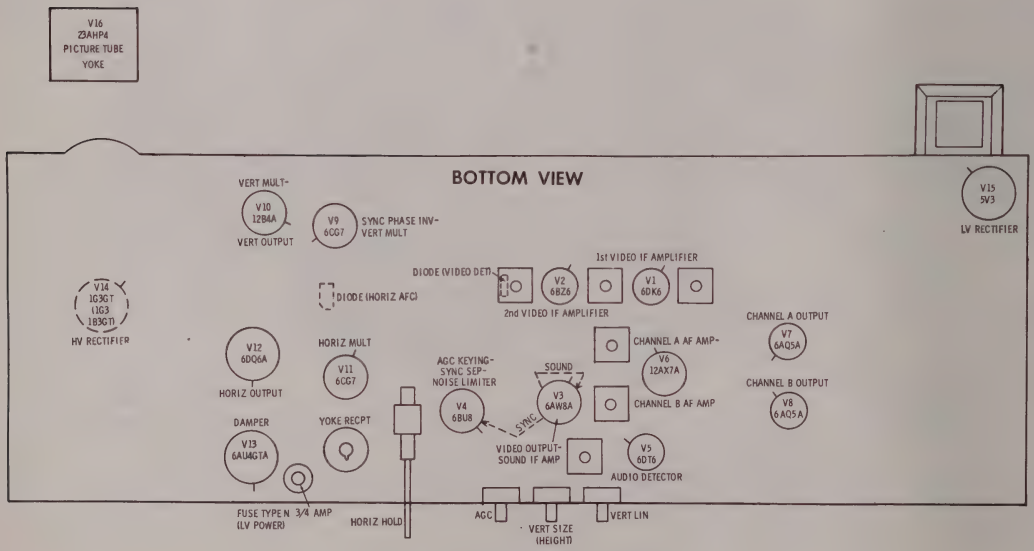
ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
M9	Tuning Cap.		AM, 2 Gang (Ant. 8-345mmf, Osc. 19-143mmf)

TV CHASSIS - TOP VIEW

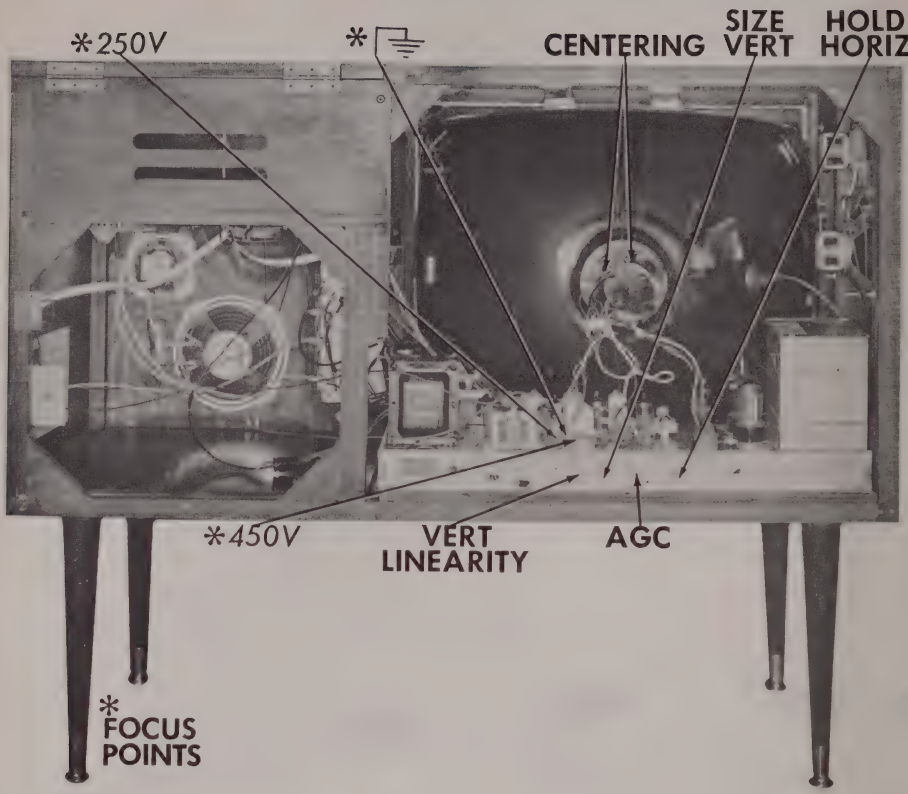
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6DK6	120K	47Ω	FIL	FIL	†4800Ω	†4800Ω	0Ω		
V2	6BZ6	.1Ω	56Ω	FIL	FIL	†5600Ω	†5600Ω	0Ω		
V3	6AW8A	0Ω	100K	†100K	FIL	FIL	●100Ω	6900Ω	†4500Ω	†7500Ω
V4	6BU8	†3300Ω	†8200Ω	2meg	FIL	FIL	†40K	†390K	†26K	†4.7meg
V5	6DT6	18Ω	680Ω	FIL	FIL	†660K	†11K	560K		
V6	12AX7A	†480K	2.2meg	270Ω	FIL	FIL	†480K	2.2meg	270Ω	FIL
V7	6AQ5A	470K	220Ω	FIL	FIL	†900Ω	†8700Ω	NC		
V8	6AQ5A	NC	220Ω	FIL	FIL	†900Ω	†8700Ω	470K		
V9	6CG7	● †3meg	220K	● 200K	FIL	FIL	†12K	1.5meg	3300Ω	0Ω
V10	12B4A	● 1100Ω	2.2meg	FIL	FIL	FIL	NC	2.2meg	NC	†380Ω
V11	6CG7	†7500Ω	1meg	1500Ω	FIL	FIL	†100K	56K	1500Ω	0Ω
V12	6DQ6A	NC	FIL	NC	†12K	470K	TP	FIL	0Ω	TOP CAP †16Ω
V13	6AU4GTA	NC	NC	620K	NC	†50Ω	NC	FIL	FIL	
V14	1G3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †445Ω
V15	5V3	NC	¶ 60K	NC	23Ω	NC	25Ω	NC	¶ 60K	
V16	23AHP4	FIL	22K	Pin 6 †120K	Pin 10 †120K	Pin 11 ● 100K	Pin 12 FIL			
V17	6BE6	22K	.1Ω	FIL	FIL	◓†8200Ω	◓†8200Ω	4.3meg		
V18	6BA6	4.3meg	0Ω	FIL	FIL	◓†8200Ω	◓†8200Ω	270Ω		
V201	6BN4A	0Ω	3.2meg	FIL	FIL	†5000Ω	0Ω	0Ω		
V202	6CG8	10K	†19K	0Ω	FIL	FIL	†5000Ω	†14K	0Ω	320K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

ALL MEASUREMENTS MADE IN "TV" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM PIN 8 OF V15. ◓ MEASURED IN "RADIO" POSITION.
† MEASURED FROM PIN 3 OF V13. NC NO CONNECTION TP TIE POINT



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the Brightness and Contrast for a normal picture.

Turn the Horizontal Hold (Freq. Slug) clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

Turn the Horizontal Hold slowly counterclockwise until the picture just falls into sync.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 11 wood screws holding rear cover. Remove rear cover.
2. Remove 11 push-on type knobs at front.
3. Disconnect phono motor plug and pick-up lead plug.
4. Remove 6 chassis bolts.
5. Remove 5 nuts holding control panel (VHF Tuner, AM Tuner, controls mounted on panel). Note: Remove panel in record changer compartment (2 screws) for access to 2 nuts at top of control panel.
6. Disconnect antenna leads, speaker leads, yoke plug, picture tube socket, and high voltage lead.
7. Remove chassis with control panel.

CHASSIS AND PICTURE TUBE ASSEMBLY REMOVAL

1. Remove rear cover.
2. Remove 5 bolts holding chassis and picture tube assembly mounting board to cabinet.
3. Remove 5 nuts holding control panel.
4. Disconnect speaker leads and 2 phono plugs from TV chassis.
5. Remove (picture tube and chassis) mounting board with control panel.

PHOTOFACT® Folder with CIRCUITRACE®

ADMIRAL MODELS Y2091, Y2093, Y2098 (Ch. 8A2)

MODEL Y2091

ADMIRAL MODELS Y2091, Y2093, Y2098 (Ch. 8A2)

ADMIRAL MODELS Y2091, Y2093, Y2098 (Ch. 8A2)

TRADE NAME	Admiral Models Y2091, Y2093, Y2098 (Ch. 8A2)
MANUFACTURER	Admiral Sales Corp., Service Div., 903 Morrissey Drive, P. O. Box 845, Bloomington, Illinois
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	6 Volts DC
RATING	9MA @ 6 Volts DC (No Signal, Min. Volume)
	20MA @ 6 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	535 — 1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3, A5..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A4, A6..... GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400% Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1620KC	"	"	A4	"
3.	"	535KC	Tuning gang fully closed.	"	A5	"
4.	"	1400KC	1400KC Signal.	"	A6	Adjust for maximum output. Repeat Steps 2, 3 and 4.

DISASSEMBLY

1. Remove cabinet back by inserting coin in slot on bottom edge and twisting.
2. Remove knobs by pulling off.
3. Remove screw holding battery holder to speaker.
4. Remove 3 Phillips screws near outside center of board. Keep the 3 spacers to replace on the screws when reassembling (Do not remove the 4 screws located away from the edges).
5. Remove Chassis and battery holder from case.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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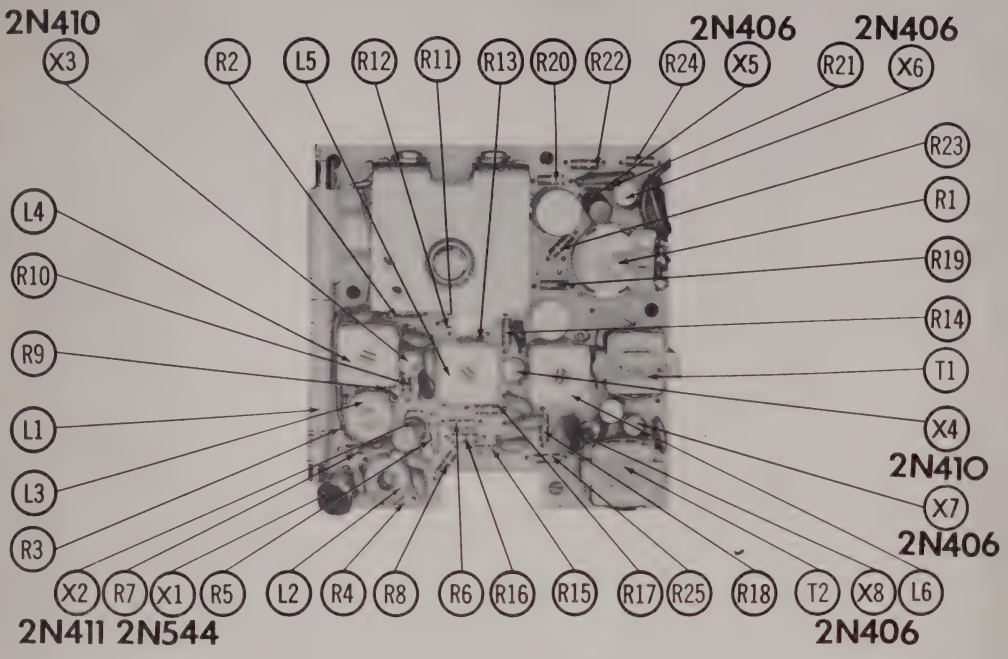
KF598

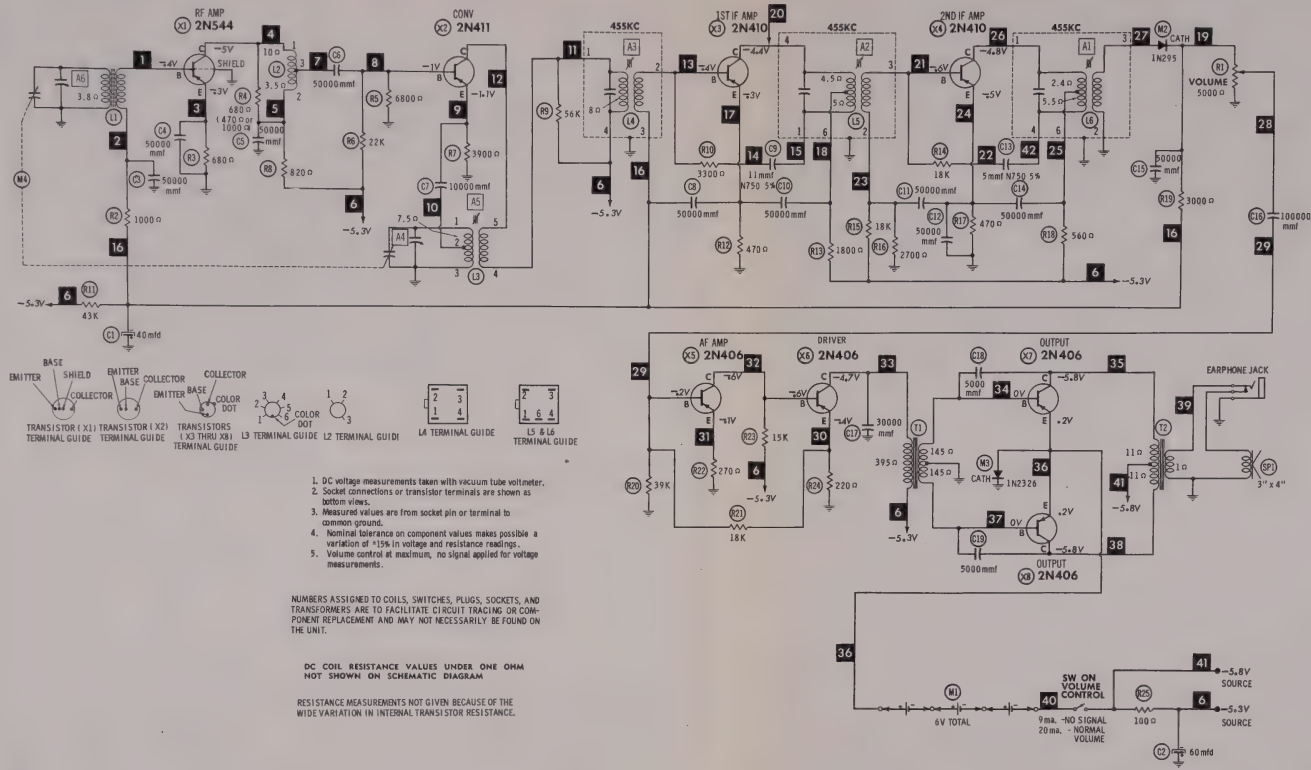
SET 541 FOLDER 3



CHASSIS TOP VIEW

A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE
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ADMIRAL MODELS Y2091, Y2093, Y2098 (Ch. 8A2)

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N544	RF Amplifier			2N544	PNP
X2	2N411	Converter	2N411	2N486	2N411	PNP
X3	2N410	1st IF Amplifier	2N410	2N483	2N410	PNP
X4	2N410	2nd IF Amplifier	2N410	2N483	2N410	PNP
X5	2N406	AF Amplifier	2N406	2N362	2N406	PNP
X6	2N406	Driver	2N406	2N362	2N406	PNP
X7	2N406	Output	2N406	2N362	2N406	PNP } Matched
X8	2N406	Output	2N406	2N362	2N406	PNP } Pair

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	40	3	67B32-9	BCD3035	ECPB114	PET140	MLV40-3	VL-1045	
C2	60	6	67B32-8	BCD6075	ECPB116	PET1260	MLV50-6	VL-1097	

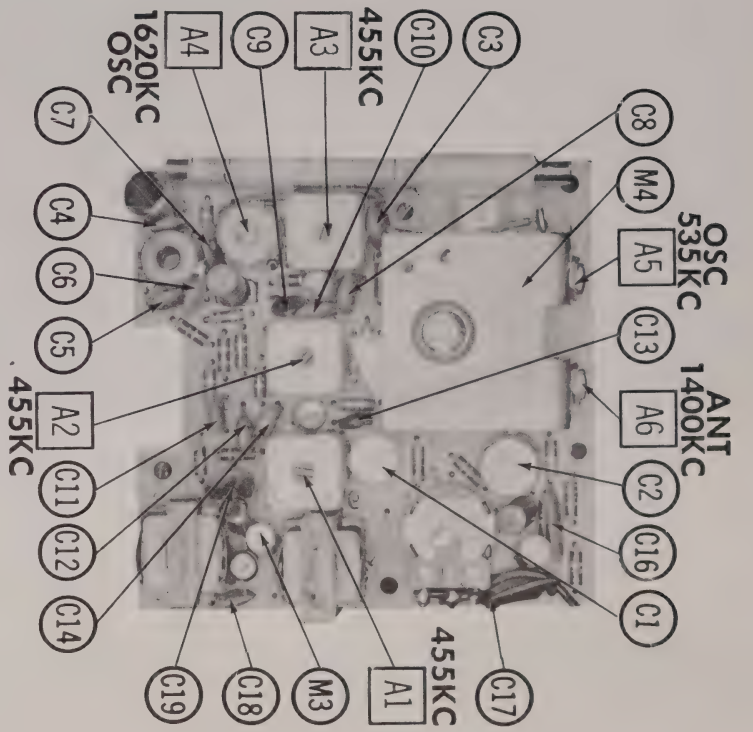
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA						
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-S50	
C4	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-S50	
C5	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-S50	
C6	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-S50	
C7	10000		C80V103AM	DM-103	H-05S1		TA-S10	TG-S10	
C8	50000		C80V503AM	DDA-503	H-05S5		TA-S50	TG-S50	
C9	11 N750 5%		N750-DI 10	DTN-10	C10Q1U	CCTN-100	CN7-410	10TCU-Q10	
C10	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-S50	
C11	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-S50	
C12	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-S50	
C13	5 N750 5%			DTN-5	C10V5U	CCTN-050	CN7-550	10TCU-V50	
C14	50000		C80V503AM	DD-503	H-05S5		TA-150	TG-S50	
C15	50000		C80V503AM	DD-503	H-05S5		TA-150	TG-S50	
C16	100000		C80V104AM	DDA-104	H-05P1		TA-010	TG-P10	
C17	30000	#65B45-8							
C18	5000		C80V502AM	DM-502	H-05D5	CCD-502	TA-250	TG-D50	
C19	5000		C80V502AM	DM-502	H-05D5	CCD-502	TA-250	TG-D50	

Admiral Part Number

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	75C89-2					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	1000Ω				R14	18K			
R3	680Ω				R15	18K			
R4	680Ω			(470Ω, 1000Ω) *	R16	2700Ω			
R5	6800Ω				R17	470Ω			
R6	22K				R18	560Ω			
R7	3900Ω				R19	3000Ω			
R8	820Ω				R20	39K			
R9	56K				R21	18K			
R10	3300Ω				R22	270Ω			
R11	43K				R23	15K			
R12	470Ω				R24	220Ω			
R13	1800Ω				R25	100Ω			

* Alternate Value.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		ADMIRAL PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	Loopstick	69C218-13					
L2	RF	69B247-1					
L3	Osc.	69B246-3					
L4	1st IF	72C182-13					
L5	2nd IF	72C182-11					
L6	3rd IF	72C182-13					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	ADMIRAL PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.3	1	79B84-2					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	ADMIRAL PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	200Ω CT	10-12Ω	79B85-2			TR-15 ①		① Remove Frame

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ADMIRAL PART No.	QUAM PART No.	
SP1	3"x 4"	PM	10-12Ω	78C163-1		

BATTERIES

ITEM No.	VOLTAGE	ADMIRAL PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V			930 *		1015 *		M-15R*	* 4 Required

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		ADMIRAL PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N295	57C1-2		1N295	1N295	Detector (Pigtail)
M3	1N2326	57C1-29				Output Bias Regulator

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M4	Tuning Cap.	68C82-2	2 Gang (Ant. 123mmf Max., Osc. 78mmf Max.)
	Earphone	ES201	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial	21B135-1	Knob
Knob	23B392-2	Tuning, Black
Knob	33B392-1	Volume, Black
Cabinet Back	34E158-3	Black, Model Y2091
Cabinet Back	34E158-7	White, Model Y2093
Cabinet Back	34E158-5	Green, Model Y2098
Cabinet Front	A7777	Black, Model Y2091
Cabinet Front	A7778	White, Model Y2093
Cabinet Front	A7779	Green, Model Y2098
Handle	37B193-3	Carrying

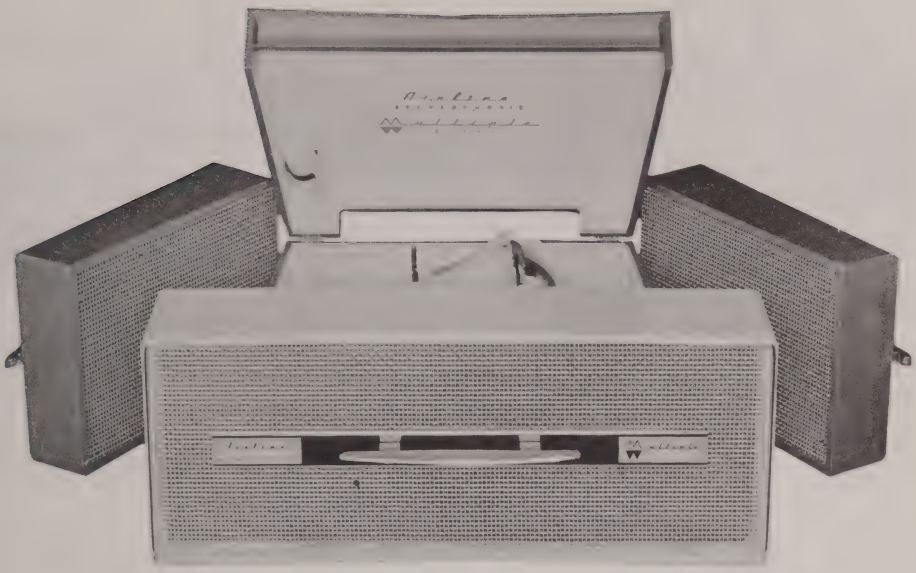
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

PHOTOFACT® Folder

AIRLINE
MODEL JWR-1041A

AIRLINE
MODEL JWR-1041A



AIRLINE
MODEL JWR-1041A

TRADE NAME	Airline Model JWR-1041R
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago 7, Illinois
TYPE SET	AC Operated 4 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	105 — 125 Volts AC, 60 Cycles RATING 65 Watts, .6 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER — SEE V-M 1201 — PHOTOFACT SET 436 FOLDER 18 OR RECORD CHANGER MANUAL RC-12

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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KT658

PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •			• RAYTHEON • SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Left Channel AF Amp. - Right Channel AF Amp.	12AX7	V3	Right Channel Output	6AQ5A
V2	Left Channel Output	6AQ5A	V4	Rectifier	5Y3GT

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	400	13535	AFH4-79	D0663	FP431.35	TMQ-4550	TVL-4737	
B	■40	400							
C	▲20	25							
D	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	100		BPD-0001	DD-101	L10T1	CCD-101	GP310	10TS-T10
C3	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C4	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C5	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C6	100		BPD-0001	DD-102	L10T1	CCD-101	GP310	10TS-T10
C7	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C8	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C9	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C10	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K *		13801	BT-159				Loudness, Left Channel
B	500K *			STR-159				Loudness, Right Channel
R2A	500K		13800	B-60	AD47-500K-Z		FB55A	Treble, Left Channel
B	500K			SR-60	Not Req.		RU55A	Treble, Right Channel
C	Shaft			Not Req.	KSS-3		CS3500	
R3A	2meg		13228	B-76	AD47-2meg-Z		FA26A	Bass, Left Channel
B	2meg			SR-76	Not Req.		RU26A	Bass, Right Channel
C	Shaft			Not Req.	KSS-3		CS3500	
R4A	1meg		13501	B-69	A47-1meg-S	QU-137	U54	Balance
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

* Taps @ 84K & 168K.

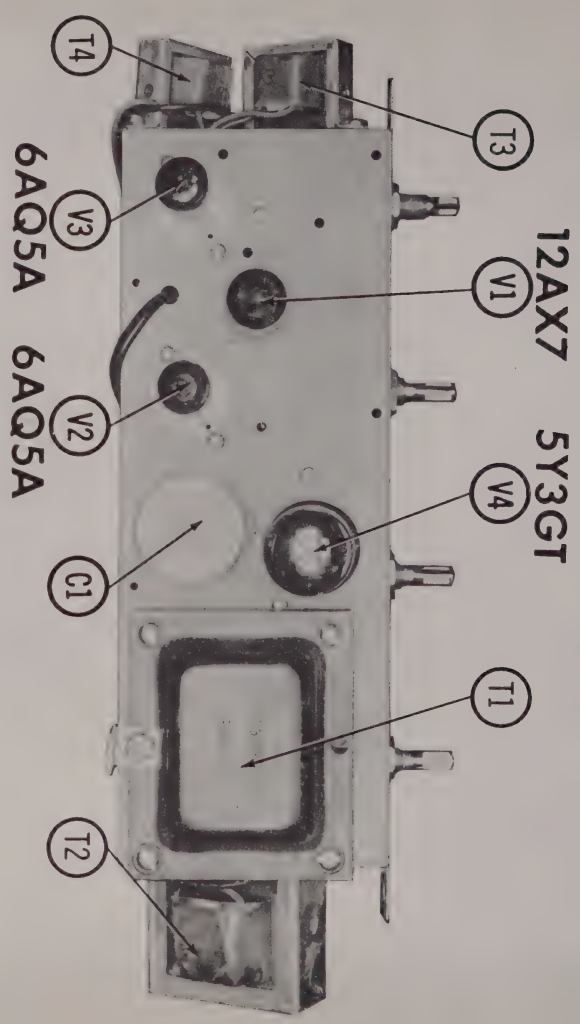
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R5	180K			
R6	220K			
R7	1500Ω			
R8	22K			
R9	8200Ω			
R10	47K			
R11	150Ω 2W			
R12	180K			

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R13	220K			
R14	22K			
R15	8200Ω			
R16	47K			
R17	2700Ω 1W			
R18	47Ω			
R19	47Ω			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
				AIRLINE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
	PRI.	SEC. 1	SEC. 2						
T1	117V @ .6A	540VCT @ .090A DC	5V @ 2A	13496		PM-8404		R-110B	
	SEC. 3	SEC. 4	SEC. 5						
	6.3VCT @ 1.2A								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
			AIRLINE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
	PRI.	SEC.						
T2	4200Ω CT	3-4Ω	14167B ①	A-2901 ②	A-3870	22S62	S-69Z	① Some versions may omit suffix letter.
T3	3400Ω	3-4Ω	14164A ①	A-3025	A-3850 ②	24S48	S-41Z	② Drill New Mounting Hole(s).
T4	3600Ω	3-4Ω	14163A ①	A-3025	A-3850 ②	24S48	S-41Z	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	QUAM PART No.	
SP1	6"	PM	3-4Ω	14328	6A21	
SP2	8"	PM	3-4Ω	13975	8A21	
SP3	6"	PM	3-4Ω	14328	6A21	

PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	REPLACEMENT DATA								NOTES
	AIRLINE PART No.		ASTATIC PART No.		ELECTRO-VOICE PART No.		SONOTONE PART No.		
	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	
M1	60-71	S-69XSD*	17D	Not Req.	26SD	S1-1 * S3-3 *	8TA4-SD	N-8TA-SD*	

CABINETS & CABINET PARTS

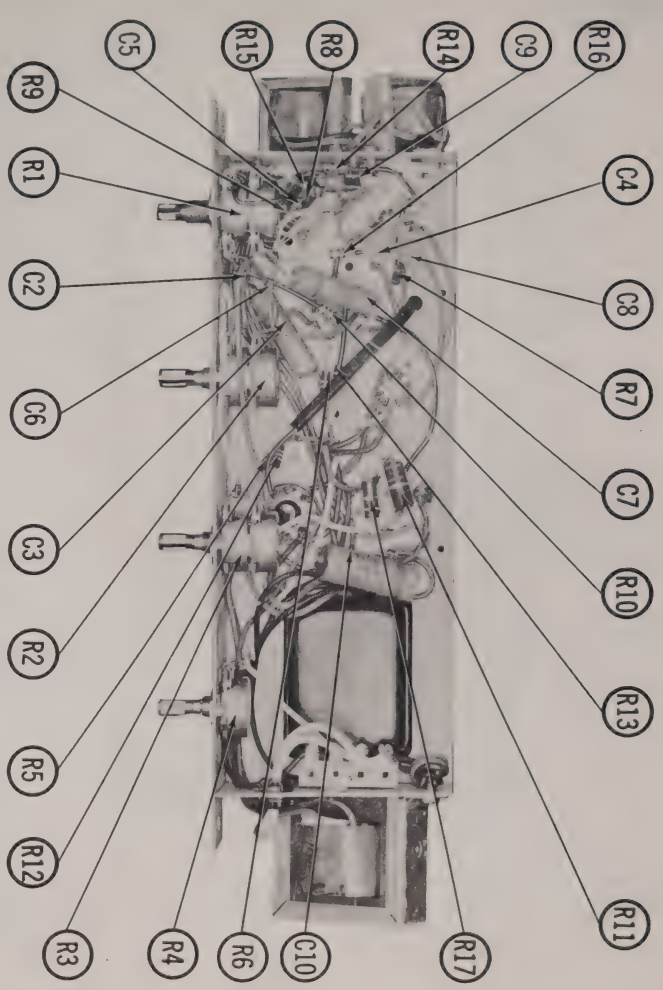
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

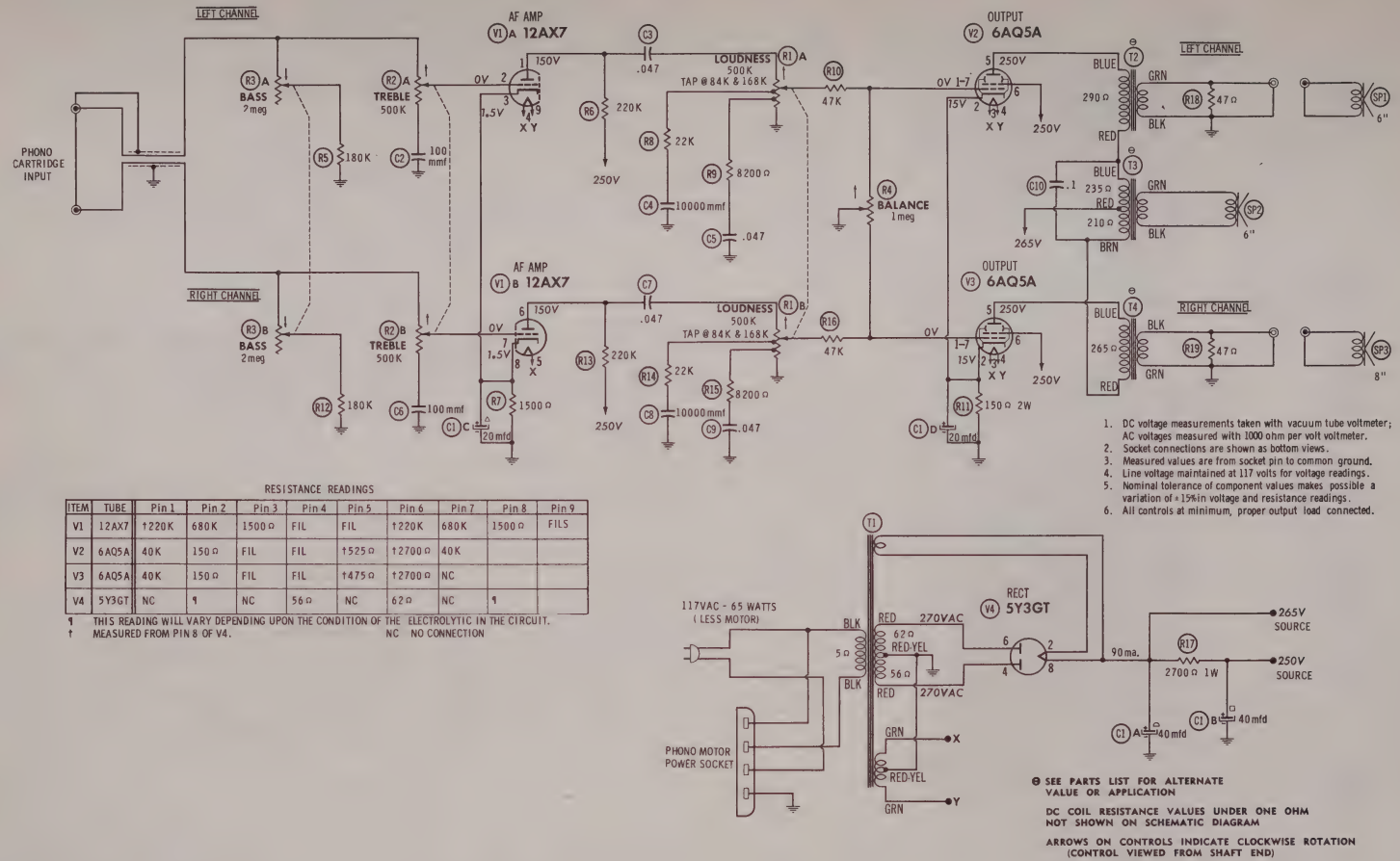
NAME	PART NO.	DESCRIPTION
Knob	14330-9J	Loudness, Bass, Treble
Knob	14580-9J	Balance
Spindle	14549	45 RPM

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†220K	680K	1500Ω	FIL	FIL	†220K	680K	1500Ω	FILS
V2	6AQ5A	40K	150Ω	FIL	FIL	†525Ω	†2700Ω	40K		
V3	6AQ5A	40K	150Ω	FIL	FIL	†475Ω	†2700Ω	NC		
V4	5Y3GT	NC	¶	NC	56Ω	NC	62Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V4. NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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AIRLINE MODEL JWR-1041A

PHOTOFACT® Folder with CIRCUITRACE®

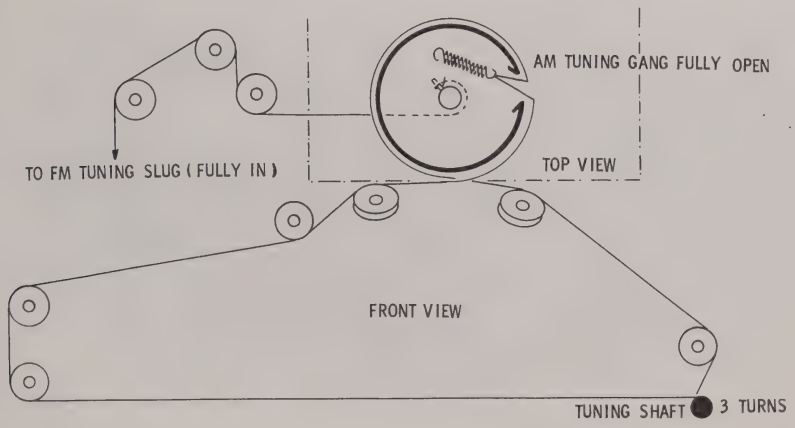
ARVIN
MODELS 30R58, 30R59

ARVIN
MODELS 30R58, 30R59

MODEL 30R58

ARVIN
MODELS 30R58, 30R59

TRADE NAME	Arvin Models 30R58, 30R59 (Ch. L 50201)		
MANUFACTURER	Arvin Industries, Inc., Columbus, Indiana		
TYPE SET	AC-DC Operated 6 Tube FM-AM Receiver		
POWER SUPPLY	105 – 120 Volts AC-DC	RATING	28 Watts, .29 Amp. @ 117 Volts AC
TUNING RANGE – BROADCAST	540 – 1670KC	FREQ. MOD.	88 – 108MC



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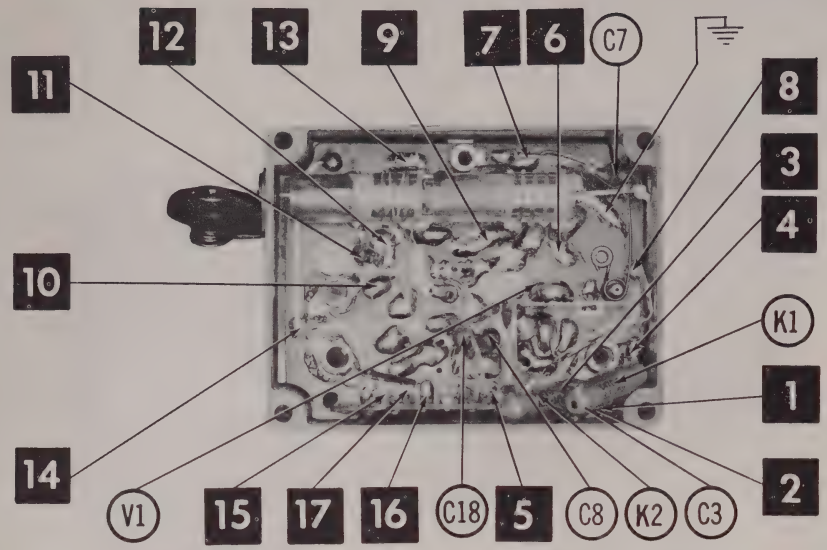
KK615

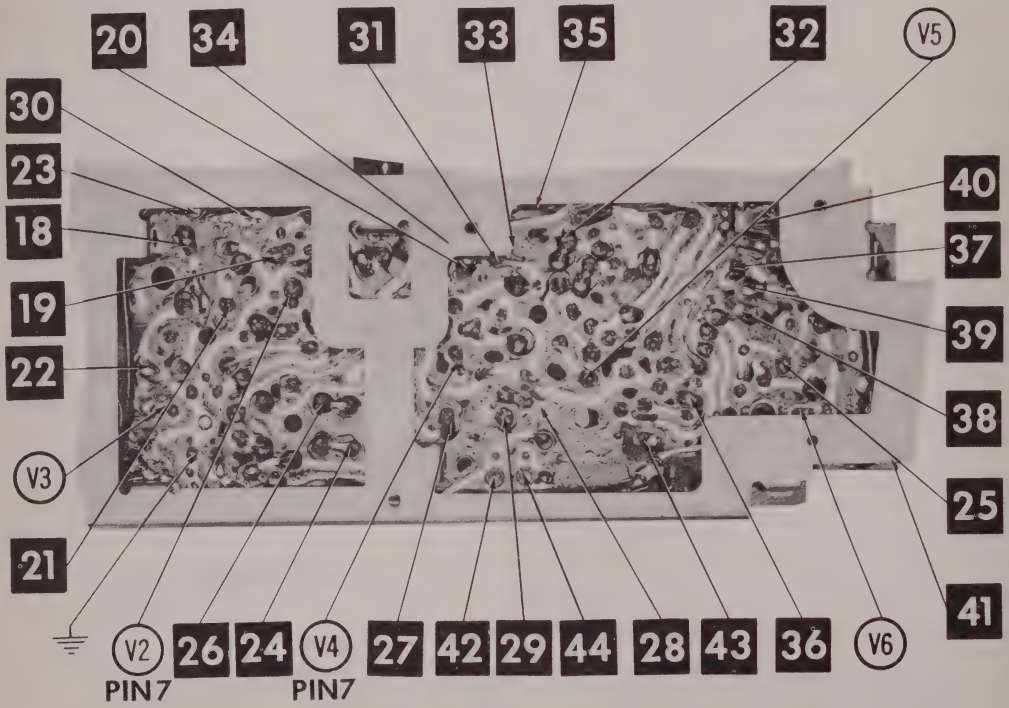
SET 541 FOLDER 5



A Howard W. Sams CIRCUITRACE* Photo

FM RF SUBCHASSIS

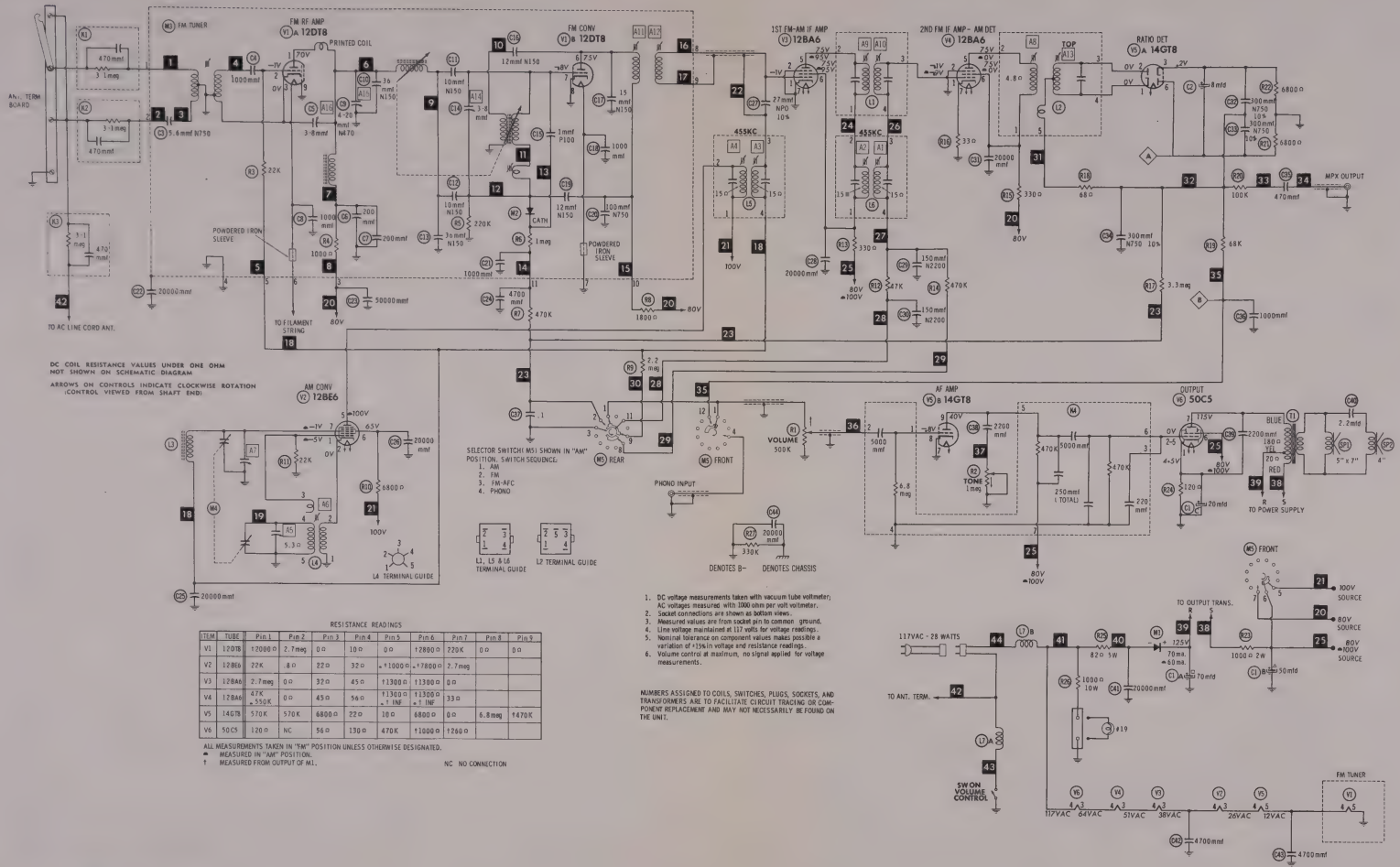
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



A Howard W. Sams CIRCUITRACE* Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12DT8	†2000Ω	2.7meg	0Ω	10Ω	0Ω	†2800Ω	220K	0Ω	0Ω
V2	12BE6	22K	8Ω	22Ω	32Ω	▲ †1000Ω	▲ †7800Ω	2.7meg		
V3	12BA6	2.7meg	0Ω	32Ω	45Ω	†1300Ω	†1300Ω	0Ω		
V4	12BA6	47K ▲ 550K	0Ω	45Ω	56Ω	†1300Ω ▲ †INF	†1300Ω ▲ †INF	33Ω		
V5	14GT8	570K	570K	6800Ω	22Ω	10Ω	6800Ω	0Ω	6.8meg	†470K
V6	50C5	120Ω	NC	56Ω	130Ω	470K	†1000Ω	†260Ω		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
▲ MEASURED IN "AM" POSITION.
† MEASURED FROM OUTPUT OF M1.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE
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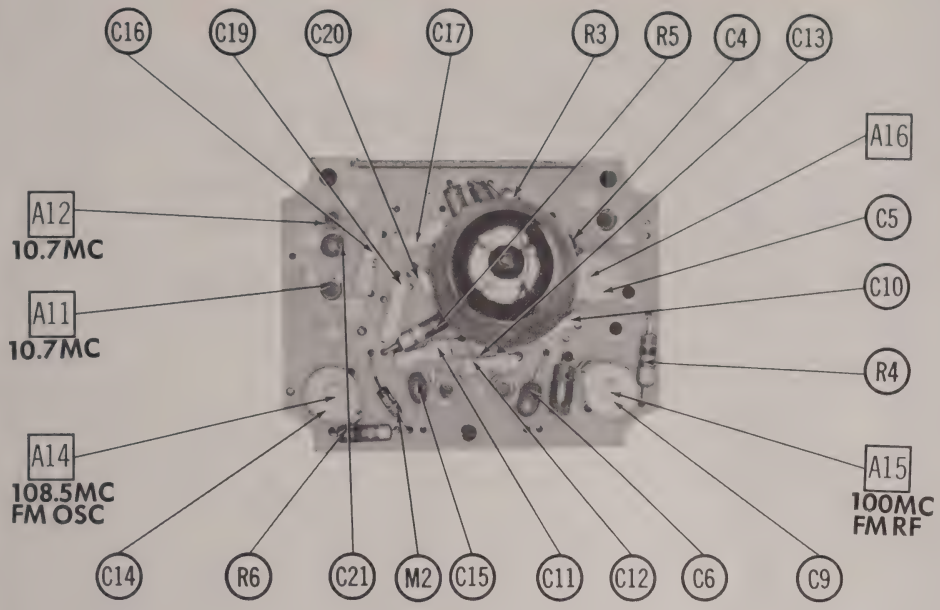
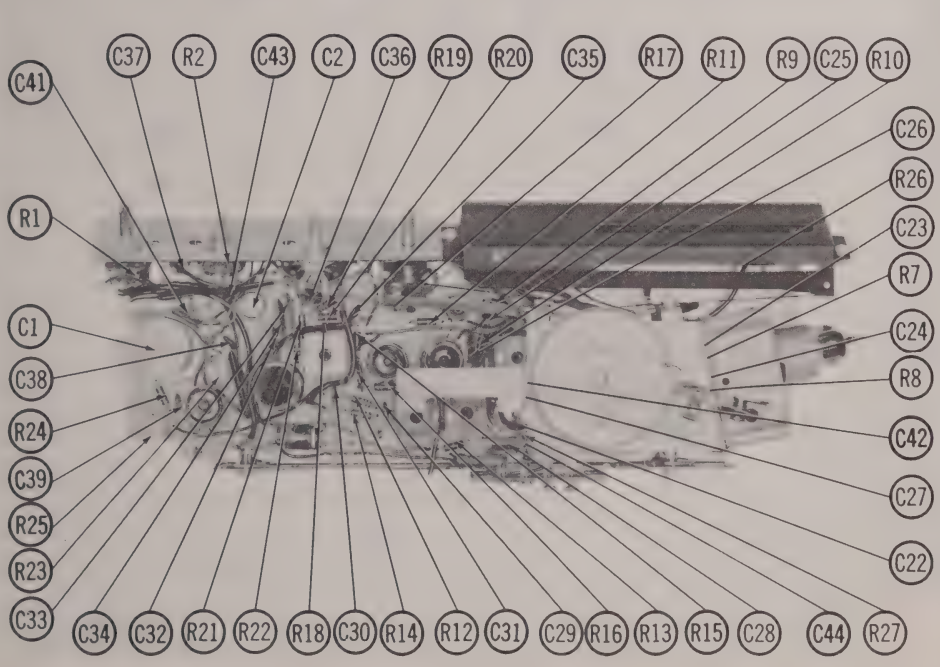
ARVIN
MODELS 30R58, 30R59



FM RF SUBCHASSIS



CHASSIS-TOP VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:

A1 thru A4, A6, A8, A9, A10, A13	GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440 WALSCO #2526, 2543, 2544, 2545
A5, A7	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A11, A12	GENERAL CEMENT #9440
A14, A15, A16	GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989 WALSCO #2515, 2531, 2532

AM ALIGNMENT — SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .05mfd to pin 7 (grid) of AM Converter. Low side to B - thru .1mfd.	455KC (400∿ 30% AM)	(AM) Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	Loop	1670KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	600KC	600KC	"	A6	"
4.	"	1400KC	1400KC Signal.	"	A7	Adjust for maximum output. Repeat Steps 2, 3 and 4.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM — SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	Across FM antenna terminals.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe to point Ⓐ. Common to B - .	A8, A9, A10, A11, A12	Adjust for maximum deflection.
6.	"	"	"	DC probe to point Ⓑ. Common to B- .	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE — SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	Across FM antenna terminals.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. to point Ⓐ. Low side to B-.	A8, A9, A10, A11, A12	Disconnect stabilizing capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C2.
6.	"	"	"	Vert. amp. to point Ⓑ. Low side to B-.	A13	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT — SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	Across FM antenna terminals with 150Ω in each lead.	108.5MC (Unmod.)	(FM) High end stop.	DC probe to point Ⓐ. Common to B- .	Idler Tension Screw.	Adjust for loose tuner string.
8.	"	"	"	"	A14	Adjust for maximum deflection.
9.	"	100MC	100MC	"	Idler Tension Screw.	Readjust for maximum deflection.
10.	"	"	"	"	A15	Adjust for maximum deflection.
11.	Not Used.		Low end stop.	"	A16	If oscillations occur, adjust A16 slightly to stop oscillation. Repeat Steps 10 and 11.

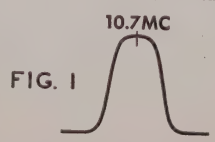


FIG. 1

FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	FM RF Amp. -FM Conv.	12DT8	V4	2nd FM IF Amp. -AM Det.	12BA6
V2	AM Converter	12BE6	V5	Ratio Det. -AF Amp.	14GT8
V3	1st FM-AM IF Amplifier	12BA6	V6	Output	50C5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■70	150	43711-14	PWH3-81-50	C0610 †	PFP311.12	TMT-3097♦	PCL-3431.1	
B	▲50	150							
C	20	25							
C2	8	25	45238-3	BCD25008	ECPB607	PET1760	MLV10-25	VL-1206	

† Use printed circuit adapters #55277 & 55278.
♦ Use printed circuit adapter kit TMA.

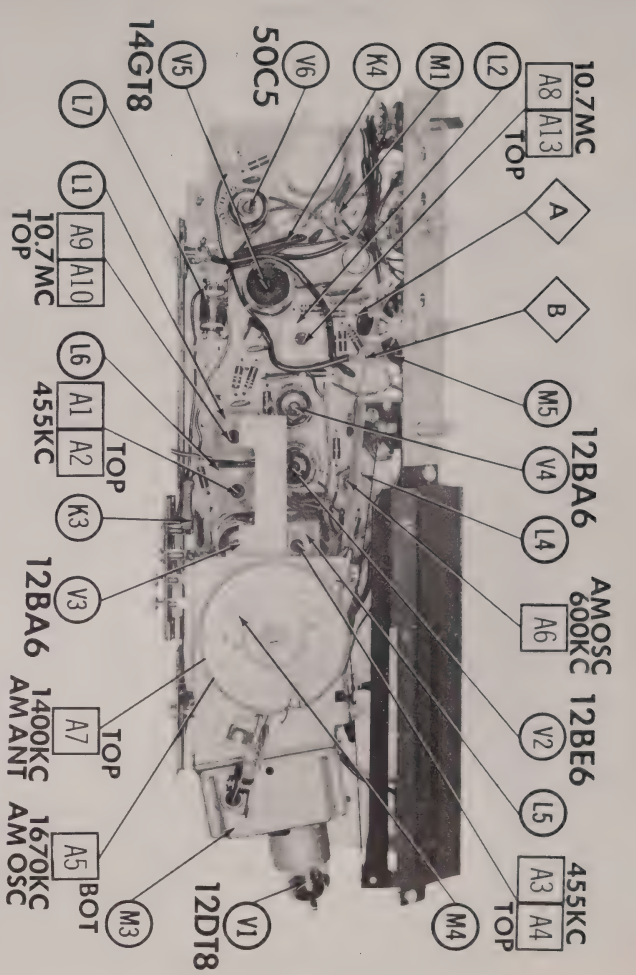
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	5.6 N750							
C4	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C5	3-8							
C6	200		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T20
C7	200		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T20
C8	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C9	4-20 N470							
C10	36 N150					*		10TCP-Q39
C11	10 N150					*		10TCP-Q10
C12	10 N150					*		10TCP-Q10
C13	36 N150					*		10TCP-Q39
C14	3-8							
C15	1 P100					*		
C16	12 N150					*		10TCP-Q12
C17	15 N150					*		10TCP-Q15
C18	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C19	12 N150					*		10TCP-Q12
C20	100 N750		N750-SI 100	TCN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C21	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C22	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C23	50000		BPD-05	DD-503	CUB6S5	6DP-3-503	GP150	5HK-S50
C24	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C25	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C26	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C27	27 NPO 10%		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C28	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C29	150 N2200					*		
C30	150 N2200					*		
C31	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C32	300 N750 10%		N750-DI 300	TCN-300	C10T3U	CCTN-301	CN7-333	10TCU-T33
C33	300 N750 10%		N750-DI 300	TCN-300	C10T3U	CCTN-301	CN7-333	10TCU-T33
C34	300 N750 10%		N750-DI 300	TCN-300	C10T3U	CCTN-301	CN7-333	10TCU-T33
C35	470		DI-470	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C36	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C37	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C38	2200		BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C39	2200		BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C40	2.2 3V			UK-225				HY-150
C41	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C42	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C43	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C44	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ARVIN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	47500-17	BPL-60	C47S-500K-Z	B13-133 *	PP55A	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			Not Req.	Not Req.	SK7 *	Not Req.	Power Off-On
R2A	1meg	½	47500-8	B-70	A47-1meg-Z	Q13-137	U53	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

* Factory Assembled Part #PPQ13-133 (SK7).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R3	22K			
R4	1000Ω			
R5	220K			
R6	1meg			
R7	470K			
R8	1800Ω			
R9	2.2meg			
R10	6800Ω			
R11	22K			
R12	47K			
R13	330Ω			
R14	470K			
R15	330Ω			

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R16	33Ω			
R17	3.3meg			
R18	68Ω			
R19	68K			
R20	100K			
R21	6800Ω			
R22	6800Ω			
R23	1000Ω 2W			
R24	120Ω			
R25	82Ω 5W	PW5-82	5W-SQ-82	
R26	1000Ω 10W	PW10-1000	10W-SQ-1000	
R27	330K			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA ARVIN PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	NOTES
L1	2nd FM IF	46971-4	FM-256	1463-PC	RTC-9046	T654	
L2	Ratio Detector	45240-3					
L3	Loopstick	46568-8	BC-419	705-A		T523	
L4	AM Osc.	43644-1					
L5	1st AM IF	44282-1	BC-356	13-PC9	RTC-8683	T614	
L6	2nd AM IF	44232-1	BC-357	13-PC10	RTC-8684	T615	
L7A	Line Choke(3.3uh)	24308-2	BC-564	4608	RTC-8518	T858	
B	Line Choke(3.3uh)		BC-564	4608	RTC-8518	T858	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ARVIN PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2400Ω Tap@10%	3-4Ω	43393-6	A-3031 ①	A-3336 ①	26S87	S-16X	① Use 6% Tap.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA ARVIN PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	5"x 7"	PM	6-8Ω	46130-3	57A1Z6.4	
SP2	4"	PM	6-8Ω	46129-1	4A05Z6.4	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ARVIN PART No.	REPLACEMENT DATA
K1	Antenna Filter	470mmf, .3-1meg	47796-2	Centralab RC-471 Sprague AC1-1
K2	Antenna Filter	470mmf, .3-1meg	47796-2	Centralab RC-471 Sprague AC1-1
K3	Antenna Filter	470mmf, .3-1meg	47796-2	Centralab RC-471 Sprague AC1-1
K4	Audio Coupling	220mmf, 250mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg	43743-2	Aerovox PA-512-3 Centralab PC-158 Mallory MS-107 Sprague DT-5

POWER RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA ARVIN PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.070A	47126-1	1N1763	2F4	SR200	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA ARVIN PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M2						AFC (Part of FM Tuner)

MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M3	FM Tuner	46969-2	Complete
M4	Tuning Cap.	49167-1	AM, 2 Gang
M5	Switch	46165-5	Function Selector, Rotary Wafer Type

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Crystal	48405	
Dial Pointer	49173	
Knob	48168	Tuning
Knob	49140	Volume
Knob	48170	Tone
Knob	49141	Function Selector
Cabinet	49458-188	Back, Model 30R58
Cabinet	49458-149	Back, Model 30R59
Cabinet	49457-149	Front, Model 30R59
Cabinet	49457-188	Front, Model 30R58

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type) ..... Use BELDEN No. 8674

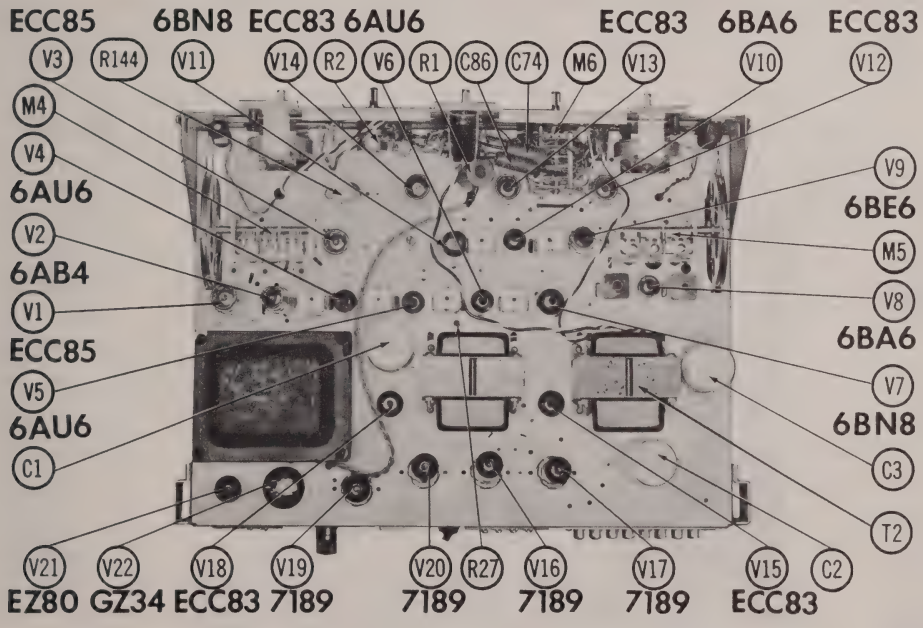
PHOTOFACT® Folder

**BELL SOUND
MODEL 2445**

BELL SOUND
MODEL 2445

TRADE NAME	Bell Model 2445		
MANUFACTURER	Bell Sound Div., Thompson Ramo Wooldridge Inc., 555 Marion Road, Columbus 7, Ohio		
TYPE SET	AC Operated FM-AM Receiver With Stereo Amplifier		
POWER SUPPLY	110 – 120 Volts AC, 60 Cycles	RATING	160 Watts, 1.5 Amp. @117 Volts AC
TUNING RANGE – BROADCAST	540 – 1600KC	FREQ. MOD.	88 – 108MC

BELL SOUND
MODEL 2445



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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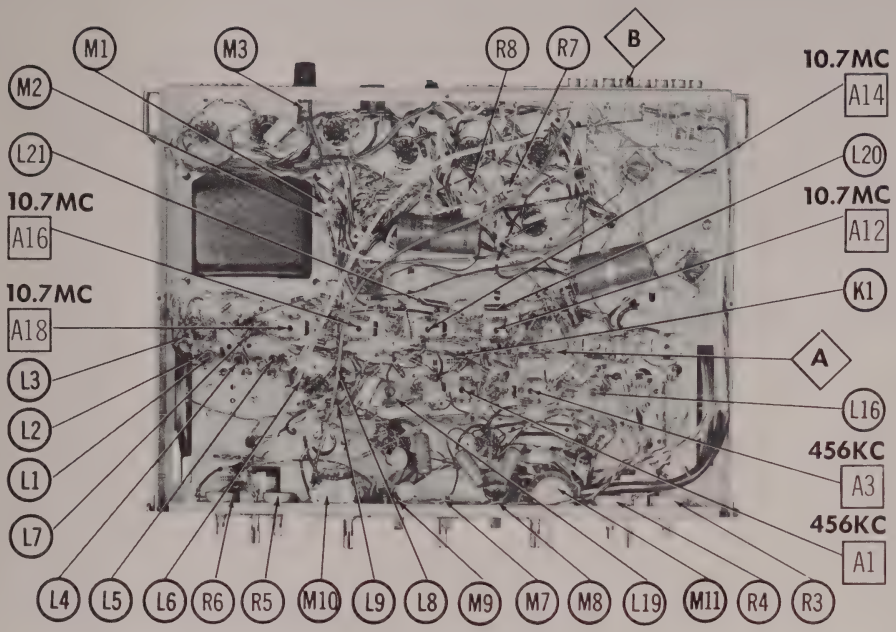
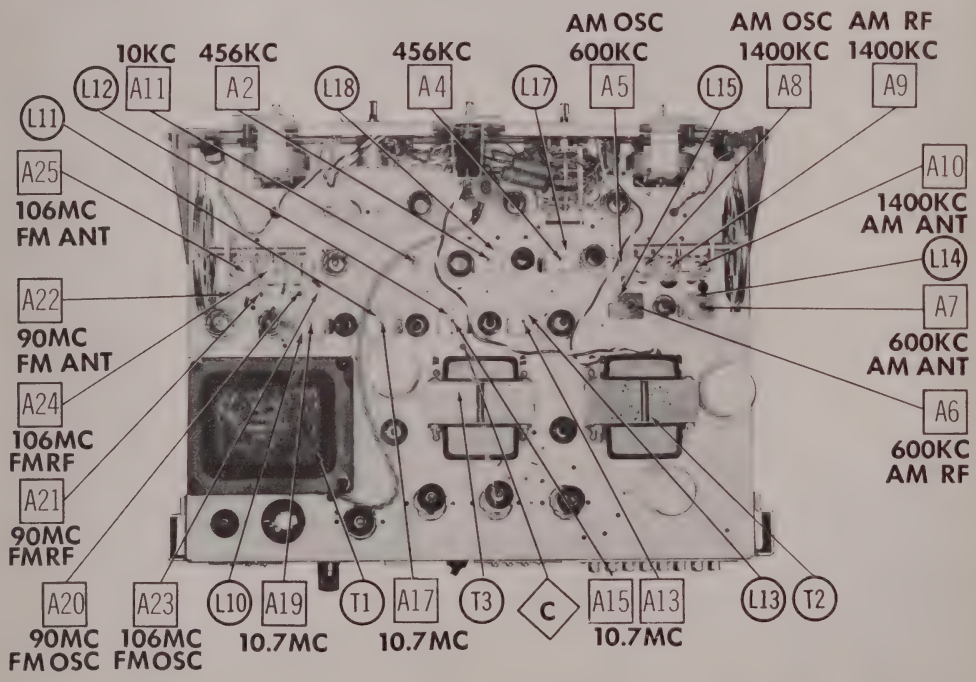


CHASSIS BOTTOM VIEW-ALIGN., CONTROL, INDUCTOR & MISC. IDENT.



CHASSIS-TOP VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.

Suggested Alignment Tools:
A1 thru A4, A6, A7, A12 thru A22...GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440 WALSCO #2526, 2543, 2544, 2545
A5, A11.....GENERAL CEMENT #8721, 8722 WALSCO #2519
A8, A9, A10, A23, A24, A25.....GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520

AM ALIGNMENT — SELECTOR IN AM POSITION

With AM Tuning gang fully closed, set AM pointer to left-hand dial indexing mark on front of chassis panel.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE AND VTVM	ADJUST	REMARKS
1.	High side thru .1mfd to pin 1 (grid) of AM IF. Low side to chassis.	456KC (40KC Swp.)	(AM) Tuning gang fully open.	Scope and AC probe of VTVM across AM Output jack.	A1, A2	Adjust for maximum output on VTVM and symmetrical response on scope.
2.	High side thru .1mfd to RF stator lug (center section) of AM tuning gang. Low side to chassis.	"	"	"	A3, A4	"
3.	High side thru 200mmf to AM antenna terminal. Low side to chassis.	600KC (400∿ 30% AM)	Second AM dial indexing mark on front panel of chassis.	"	A5, A6, A7	Adjust for maximum output.
4.	"	1400KC	Right hand AM dial indexing mark on front panel of chassis.	"	A8, A9, A10	"
5.	High side thru 100K to pin 8 (grid) of AM Cathode Follower. Low side to chassis.	10KC		"	A11	Adjust for MINIMUM output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM — SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	High side thru .01mfd to pin 1 (grid) of FM Limiter. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe to point Ⓐ. Common to chassis.	A12	Adjust for maximum deflection.
7.	"	"	"	DC probe to point Ⓑ. Common to chassis.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
8.	High side thru .01mfd to pin 1 (grid) of 2nd FM IF. Low side to chassis.	"	"	DC probe to point Ⓒ. Common to chassis.	A14, A15	Adjust for maximum deflection.
9.	High side thru .01mfd to pin 1 (grid) of 1st FM IF. Low side to chassis.	"	"	"	A16, A17	"
10.	High side thru .01mfd to pin 6 (grid) of FM Mixer. Low side to chassis.	"	"	"	A18, A19	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE — SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	High side thru .01mfd to pin 1 (grid of FM Limiter. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. to point Ⓐ. Low side to chassis.	A12	Disconnect stabilizing Capacitor C6. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C6.
7.	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A13	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines.
8.	High side thru .01mfd to pin 1 (grid) of 2nd FM IF. Low side to chassis.	"	"	Vert. amp. to point Ⓒ. Low side to chassis.	A14, A15	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
9.	High side thru .01mfd to pin 1 (grid) of 1st FM IF. Low side to chassis.	"	"	"	A16, A17	"
10.	High side thru .01mfd to pin 6 (grid) of FM Mixer. Low side to chassis.	"	"	"	A18, A19	"

FIG. 1

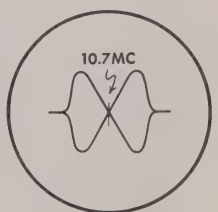
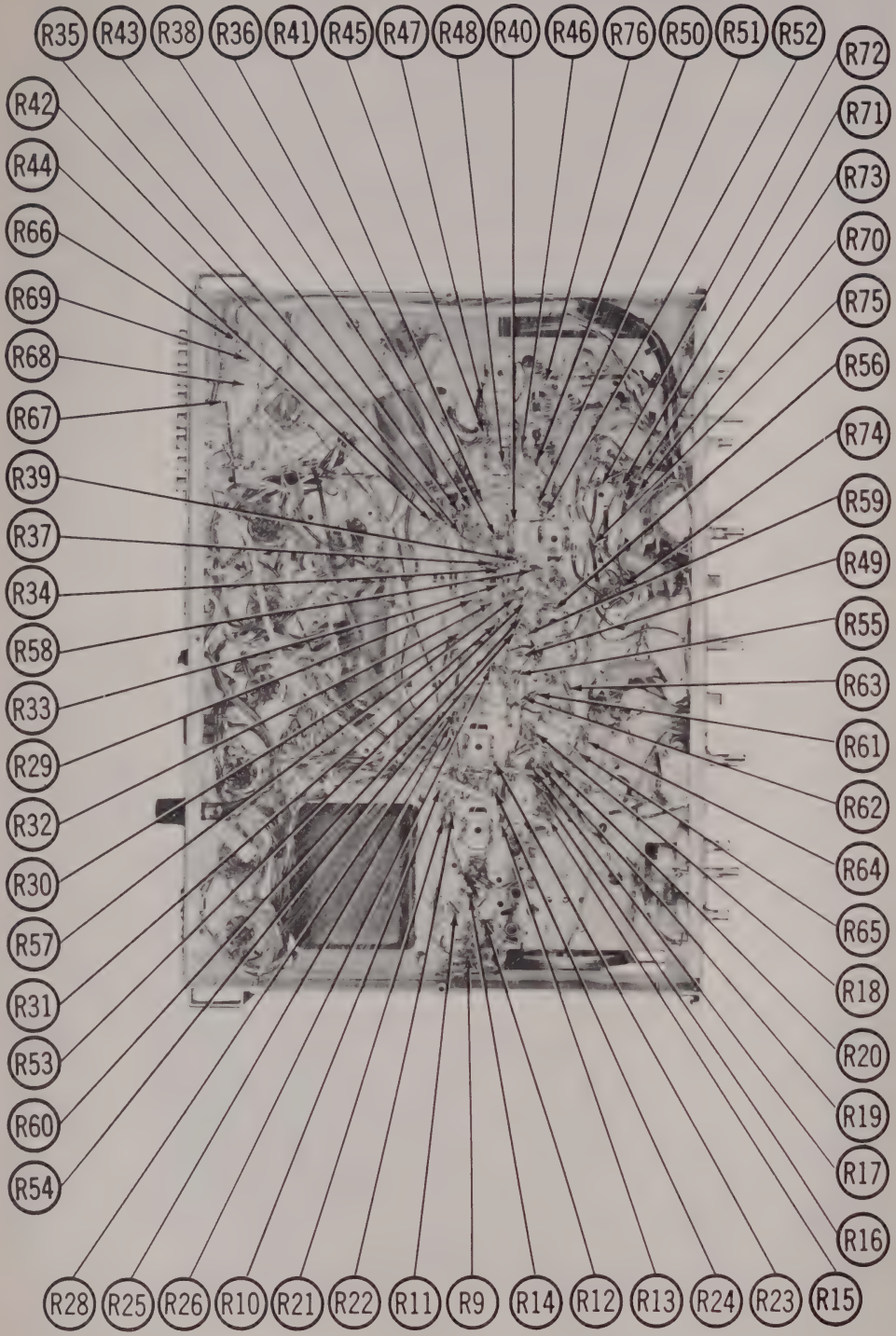


FIG. 2

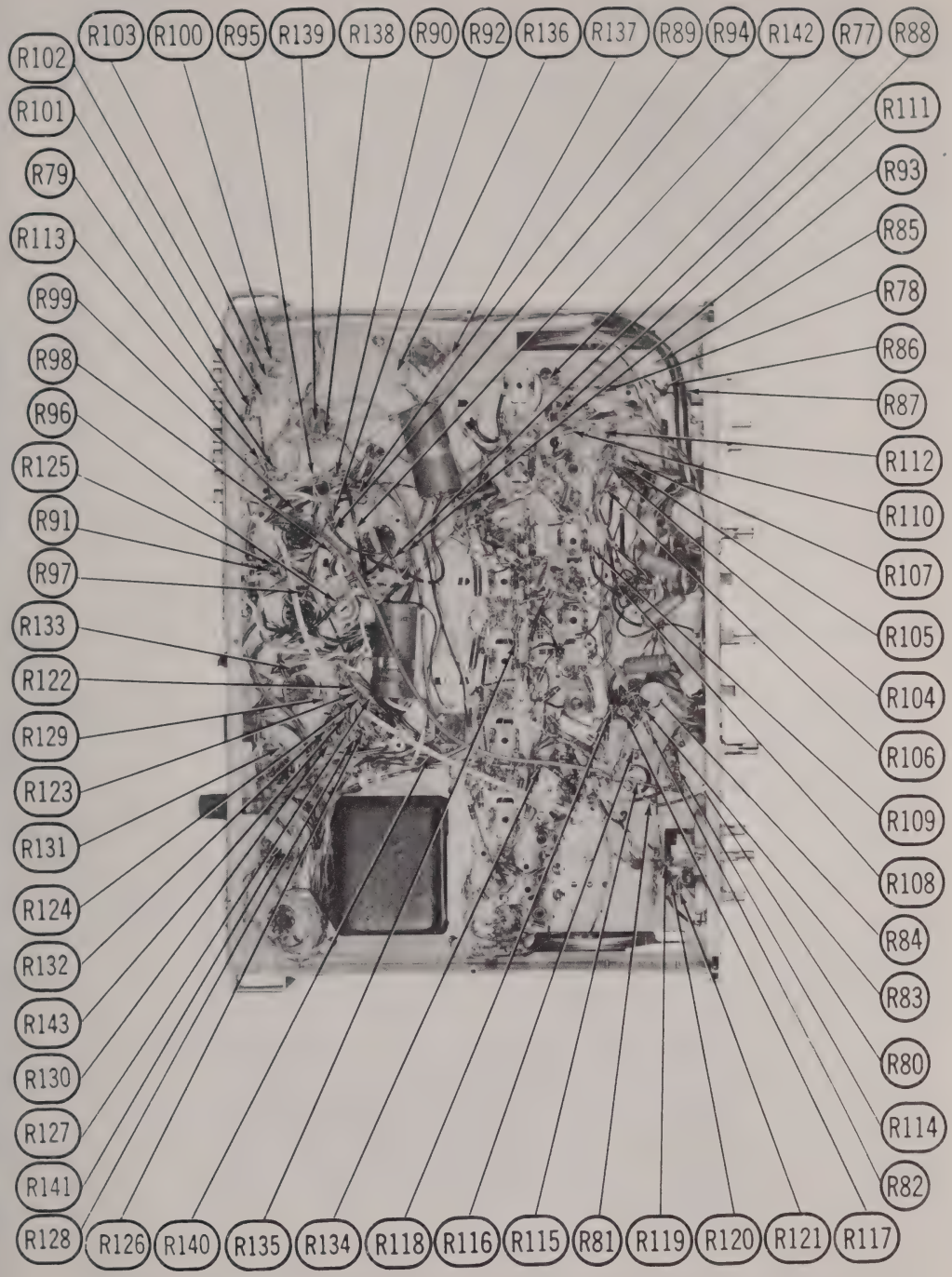
FM RF ALIGNMENT — SELECTOR IN FM POSITION

With FM tuning gang fully open, set FM pointer to right-hand dial indexing mark on front of chassis panel. AFC "Off".

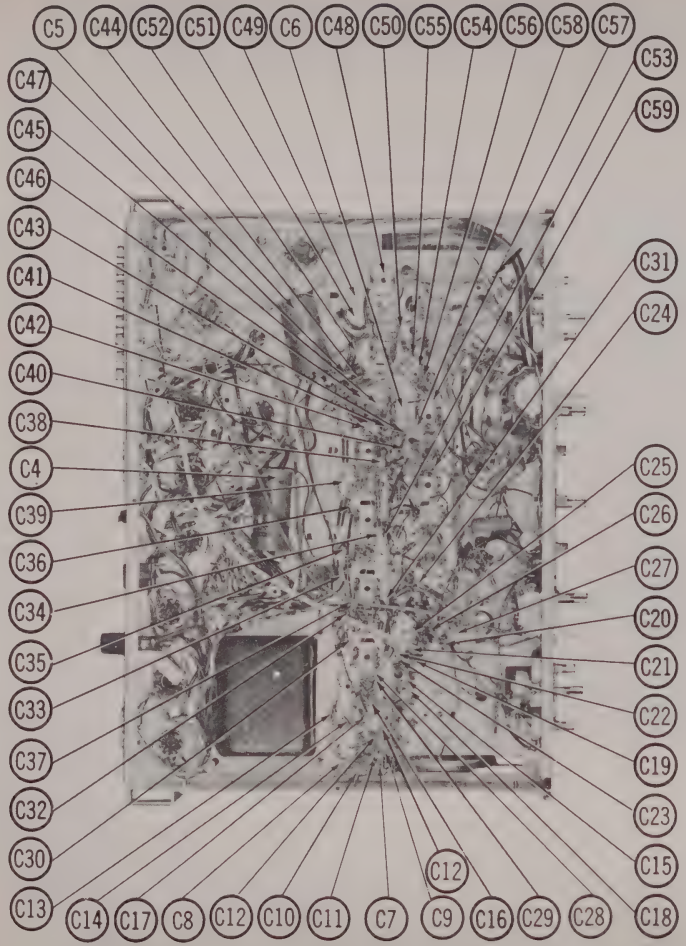
	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE AND VTVM	ADJUST	REMARKS
11.	High side thru 270Ω to FM antenna terminal. Low side to chassis.	90MC (45KC Swp)	(FM) Left-hand FM dial indexing mark on front panel of chassis.	Vert. amp. and AC probe to point Ⓒ. Common to chassis.	A20, A21, A22	Adjust for maximum output on VTVM. Use response on scope to be certain the unit is aligned on the correct slope of response.
12.	"	106MC	Second FM dial indexing mark on front panel of chassis.	"	A23, A24, A25	Adjust for maximum output. Repeat Steps 11 and 12.



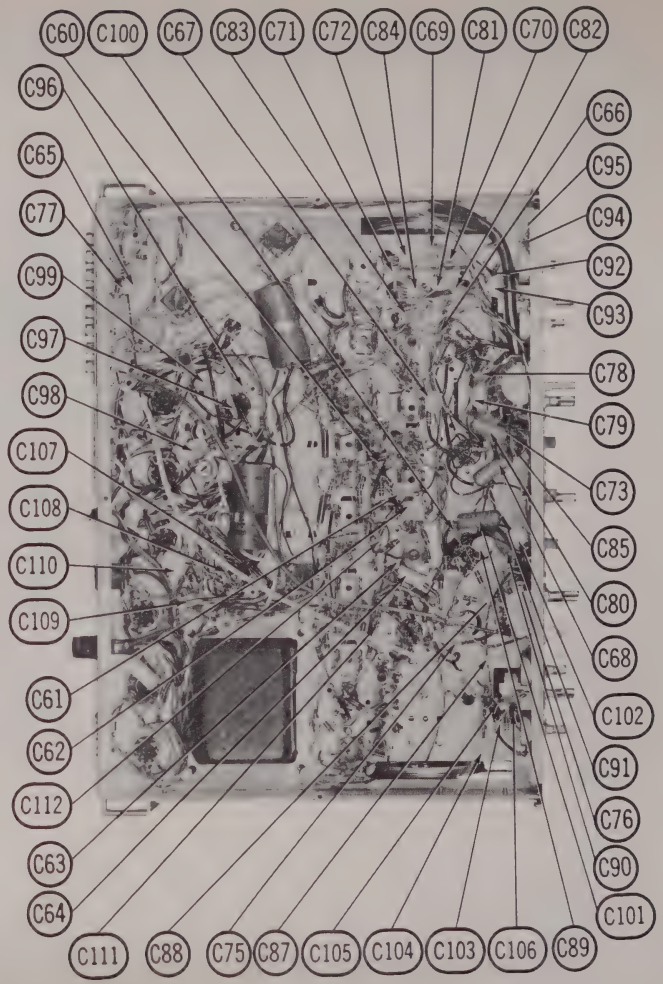
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



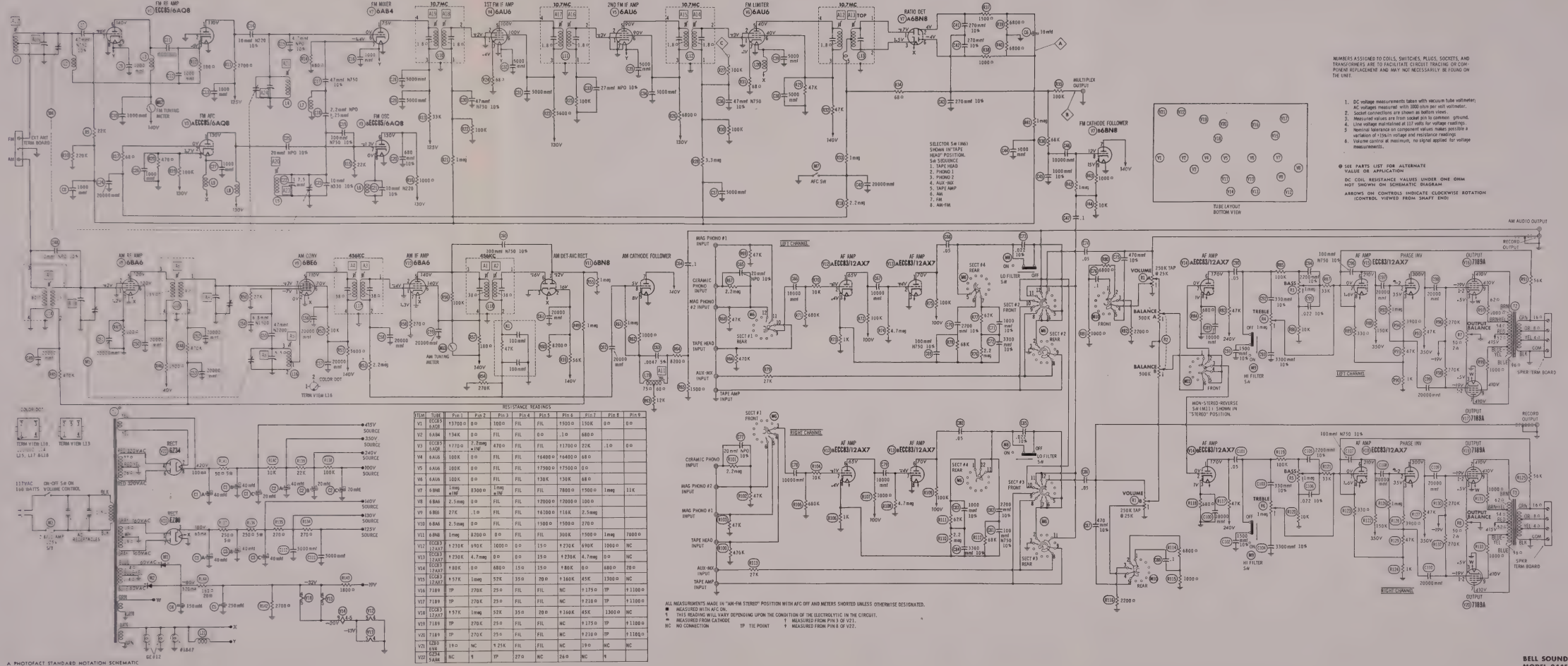
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



CHASSIS BOTTOM VIEW-CAPACITOR IDENT.



CHASSIS BOTTOM VIEW-CAPACITOR IDENT.


FM RF AMP V1 ECC85/6AQ8
FM MIXER V2 6AB4
10.7MC
1ST FM IF AMP V4 6AU6
2ND FM IF AMP V5 6AU6
FM LIMITER V6 6AU6
RATIO DET V7 6BN8
FM AFC V3 ECC85/6AQ8
FM OSC V3 ECC85/6AQ8
FM TUNING METER
EXT ANT TERM BOARD
SELECTOR SW (IW) SHOWN IN "TAPE HEAD" POSITION. SW SEQUENCE 1. TAPE HEAD 2. PHONO 1 3. PHONO 2 4. AUX-MX 5. TAPE AMP 6. AM 7. FM 8. AM-FM
MULTIPLEX OUTPUT
FM CATHODE FOLLOWER V7 6BN8
TUBE LAYOUT BOTTOM VIEW
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements.
@ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
AM RF AMP 6BA6
AM CONV V9 6BE6
456KC
AM IF AMP V10 6BA6
AM DET-AVC RECT V11 6BN8
AM CATHODE FOLLOWER
AM TUNING METER
TERM VIEW L16
COLOR DOT
MAG PHONO #1 INPUT
CERAMIC PHONO INPUT
MAG PHONO #2 INPUT
TAPE HEAD INPUT
AUX-MX INPUT
TAPE AMP INPUT
LEFT CHANNEL
AF AMP V12 ECC83/12AX7
AF AMP V13 ECC83/12AX7
SECT #1 REAR
SECT #2 REAR
SECT #2 FRONT
LO FILTER SW
VOLUME 250K TAP @ 25K
BALANCE 500K
TREBLE
BASS
HI FILTER SW
AF AMP V14 ECC83/12AX7
PHASE INV V15 ECC83/12AX7
OUTPUT V16 7189A
OUTPUT BALANCE
AM AUDIO OUTPUT
RECORD OUTPUT
SPKR TERM BOARD
MON-STEREO-REVERSE SW (M11) SHOWN IN "STEREO" POSITION.
RIGHT CHANNEL
SECT #3 REAR
SECT #4 REAR
SECT #4 FRONT
AF AMP V17 ECC83/12AX7
AF AMP V18 ECC83/12AX7
PHASE INV V19 ECC83/12AX7
OUTPUT V20 7189A
OUTPUT V21 7189A
117VAC 160 WATTS ON-OFF SW ON VOLUME CONTROL
RECT 6Z4
RECT EZ80
SPKR TERM BOARD
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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#1847
GE #12

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85 6AQ8	↑3700Ω	0Ω	100Ω	FIL	FIL	↑500Ω	150K	0Ω	0Ω
V2	6AB4	↑34K	0Ω	FIL	FIL	0Ω	.1Ω	680Ω		
V3	ECC85 6AQ8	↑770Ω	2.2meg ∞INF	470Ω	FIL	FIL	↑1700Ω	22K	.1Ω	0Ω
V4	6AU6	100K	0Ω	FIL	FIL	↑6400Ω	↑6400Ω	68Ω		
V5	6AU6	100K	0Ω	FIL	FIL	↑7500Ω	↑7500Ω	0Ω		
V6	6AU6	100K	0Ω	FIL	FIL	↑30K	↑30K	68Ω		
V7	6BN8	1meg ∞INF	8300Ω	1meg ∞INF	FIL	FIL	7800Ω	↑500Ω	1meg	11K
V8	6BA6	2.5meg	0Ω	FIL	FIL	↑7000Ω	↑2000Ω	100Ω		
V9	6BE6	27K	.1Ω	FIL	FIL	↑6100Ω	↑16K	2.5meg		
V10	6BA6	2.5meg	0Ω	FIL	FIL	↑500Ω	↑500Ω	270Ω		
V11	6BN8	1meg	8200Ω	0Ω	FIL	FIL	300K	↑500Ω	1meg	7000Ω
V12	ECC83 12AX7	↑230K	690K	1000Ω	0Ω	15Ω	↑230K	690K	1000Ω	NC
V13	ECC83 12AX7	↑230K	4.7meg	0Ω	0Ω	15Ω	↑230K	4.7meg	0Ω	NC
V14	ECC83 12AX7	↑80K	0Ω	680Ω	15Ω	15Ω	↑80K	0Ω	680Ω	70Ω
V15	ECC83 12AX7	↑57K	1meg	52K	35Ω	70Ω	↑160K	45K	1300Ω	NC
V16	7189	TP	270K	25Ω	FIL	FIL	NC	↑175Ω	TP	↑1100Ω
V17	7189	TP	270K	25Ω	FIL	FIL	NC	↑210Ω	TP	↑1100Ω
V18	ECC83 12AX7	↑57K	1meg	52K	35Ω	70Ω	↑160K	45K	1300Ω	NC
V19	7189	TP	270K	25Ω	FIL	FIL	NC	↑175Ω	TP	↑1100Ω
V20	7189	TP	270K	25Ω	FIL	FIL	NC	↑210Ω	TP	↑1100Ω
V21	EZ80 6V4	190Ω	NC	↑25K	FIL	FIL	190Ω	NC	NC	
V22	6Z4 5AM4	NC	↑	TP	27Ω	NC	26Ω	NC	↑	

ALL MEASUREMENTS MADE IN "AM-FM STEREO" POSITION WITH AFC OFF AND METERS SHORTED UNLESS OTHERWISE DESIGNATED.
■ MEASURED WITH AFC ON.
↑ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
* MEASURED FROM CATHODE ↑ MEASURED FROM PIN 3 OF V21.
NC NO CONNECTION TP TIE POINT ↑ MEASURED FROM PIN 8 OF V22.

BELL SOUND MODEL 2445

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (• GENERAL ELECTRIC • RAYTHEON • SYLVANIA •)
V1	FM RF Amplifier	ECC85/6AQ8
V2	FM Mixer	6AB4
V3	FM Osc. -AFC	ECC85/6AQ8
V4	1st FM IF Amplifier	6AU6
V5	2nd FM IF Amplifier	6AU6
V6	FM Limiter	6AU6
V7	Ratio Detector-FM Cathode Follower	6BN8
V8	AM RF Amplifier	6BA6
V9	AM Converter	6BE6
V10	AM IF Amplifier	6BA6
V11	AM Det. -AVC Rect. - Cathode Follower	6BN8
V12	Left Channel AF Amp. - Right Channel AF Amp.	ECC83/12AX7
V13	Left Channel AF Amp. - Right Channel AF Amp.	ECC83/12AX7
V14	Left Channel AF Amp. - Right Channel AF Amp.	ECC83/12AX7
V15	Left Channel AF Amp. - Phase Inverter	ECC83/12AX7
V16	Left Channel Output	7189 (7189A) *
V17	Left Channel Output	7189 (7189A) *
V18	Right Channel AF Amp. - Phase Inverter	ECC83/12AX7
V19	Right Channel Output	7189 (7189A) *
V20	Right Channel Output	7189 (7189A) *
V21	Rectifier	EZ80/6V4
V22	Rectifier	GZ34/5AR4

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BELL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	23B87	AFH3-43-50	C0330	FP376.9	TMT-3745	TVL-3786	
B	■40	450							
C	▲20	450							
C2A	▲40	450	23B97	AFH3-50-05	C0372	FP396.1	TMT-3745	TVL-3784	
B	▲20	350							
C	■20	350							
C3A	▲40	200	23B37	AFH4-01-60	D0022	FP327.89	TMQ-4104	TVL-2575 TVA-1511	
B	■40	200							
C	▲40	200							
C4	150	150	23A99	PRS1520	BR15015	TC495	TD-150-150	TVA-1422	
C5	250	50	23B23	PRS1380	BR2505	TC50025	TD-250-50	TVA-1312	
C6	10	50	23A45	PTT92	NLW10-50	TC32	MLV10-50	TE-1304	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C7	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C8	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C9	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C10	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C11	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C12	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C13	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C14	10 N220 10%	#24A132				*		10TCR-Q10
C15	4.7 NPO 10%		NPO-DI 4.7	DTZ-4R7	C10V47C		CNO-547	10TCC-V47
C16	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C17	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C18	2.2 NPO + .25mmf		NPO-DI 2.2	DTZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C19	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C20	680 10%		DI-680	DD-681	5R5T68	CCD-681	GP368	10TS-T68
C21	10 N220 10%	#24A132				*		10TCR-Q10
C22	1-7.5	#25A17		829-7				
C23	10 N330 10%	#24X143				*		10TCS-Q10
C24	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C25	20 NPO 10%		NPO-DI 20	DTZ-20	C10Q2C	CCTO-200	CNO-422	10TCC-Q20

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C26	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C27	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C28	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C29	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C30	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C31	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C32	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C33	27 NPO 10%		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C34	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C35	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C36	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C37	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C38	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C39	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C40	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C41	270 10%		DI-270	DD-271	L10Q27	CCD-271	GP327	10TS-T27
C42	270 10%		DI-270	DD-271	L10Q27	CCD-271	GP327	10TS-T27
C43	270 10%		DI-270	DD-271	L10Q27	CCD-271	GP327	10TS-T27
C44	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C45	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C46	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C47	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C48	12 NPO 10%			TCZ-12	C10Q12C	CCTO-120	CNO-412	10TCC-Q12
C49	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C50	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C51	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C52	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C53	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C54	6.8 N1500	#24X141				*		
C55	47 N2200	#24X142				*		
C56	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C57	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C58	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C59	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C60	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C61	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C62	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C63	.0047 200V 5%		V84C2D47-5%		1R5D47	CM-19B-472J	MCJ464	MS-247
C64	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C65	20 NPO 10%		NPO-DI 20	DTZ-20	C10Q2C	CCTO-200	CNO-420	10TCC-Q20
C66	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C67	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C68	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C69	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C70	2200 10%		DI-2200		PM6D22	CCD-222	GP222	10TS-D22
C71	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C72	3300 10%		DI-3300		PM6D33	CCD-332	JL-233	10TS-D33
C73	.022 50V 10%		V84C2S22-10%		PM4S22	1DP-1-223	GEM-1612	2TM-S22
C74	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C75	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C76	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C77	20 NPO 10%		NPO-DI 20	DTZ-20	C10Q2C	CCTO-200	CNO-420	10TCC-Q20
C78	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C79	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C80	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C81	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C82	2200 10%		DI-2200		PM6D22	CCD-222	GP222	10TS-D22
C83	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C84	3300 10%		DI-3300		PM6D33	CCD-332	JL-233	10TS-D33
C85	.022 50V 10%		V84C2S22-10%		PM4S22	1DP-1-223	GEM-1612	2TM-S22
C86	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C87	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47

PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C88	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C89	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C90	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C91	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C92	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C93	3300 10%		DI-3300		PM6D33	CCD-332	JL-233	10TS-D33
C94	2200 10%		DI-2200		PM6D22	CCD-222	GP222	10TS-D22
C95	.022 50V 10%		V84C2S22-10%		PM4S22	1DP-1-223	GEM-1612	2TM-S22
C96	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C97	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C98	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C99	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C100	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C101	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C102	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C103	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C104	3300 10%		DI-3300		PM6D33	CCD-332	JL-233	10TS-D33
C105	2200 10%		DI-2200		PM6D22	CCD-222	GP222	10TS-D22
C106	.022 50V 10%		V84C2S22-10%		PM4S22	1DP-1-223	GEM-1612	2TM-S22
C107	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C108	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C109	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C110	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C111	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C112	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
\# Bell Part Number.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	BELL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	250K 25K Tap	½	15A90					Volume, Left Channel
B	250K 25K Tap	½						Volume, Right Channel
C	Switch							Power Off-On
R2A	500K	½	15A102	B-59	AD47-500K-S		FA55L	Balance, Left Channel
B	500K	½		SR-59	Not Req.		RU55L	Balance, Right Channel
C	Shaft			Not Req.	KSS-3		CS3500	
R3A	1meg	½	15A92	B-70	A47-1meg-Z	Q13-137	U53	Bass, Left Channel
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4A	1meg	½	15A92	B-70	A47-1meg-Z	Q13-137	U53	Treble, Left Channel
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R5A	1meg	½	15A92	B-70	A47-1meg-Z	Q13-137	U53	Bass, Right Channel
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R6A	1meg	½	15A92	B-70	A47-1meg-Z	Q13-137	U53	Treble, Right Channel
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R7	50Ω	2(WW)	15A95					Output Balance, Left Channel
R8	50Ω	2(WW)	15A95					Output Balance, Right Channel

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R9	22K				R18	2.2meg			
R10	220K				R19	100K			
R11	2700Ω				R20	470Ω			
R12	100Ω				R21	1meg			
R13	33K				R22	100K			
R14	680Ω				R23	5600Ω			
R15	22K				R24	68Ω			
R16	1000Ω				R25	100K			
R17	68Ω				R26	6800Ω			

RESISTORS (cont)

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R27	100K				R86	10K			
R28	3.3meg				R87	33K			
R29	47K				R88	150K			
R30	100K				R89	330Ω			
R31	68Ω				R90	1000Ω			
R32	47K				R91	56K			
R33	1meg				R92	1meg			
R34	68Ω				R93	47K			
R35	100K				R94	3900Ω			
R36	68K				R95	47K			
R37	1500Ω				R96	270K			
R38	1000Ω				R97	1000Ω			
R39	6800Ω				R98	270K			
R40	6800Ω				R99	1000Ω			
R41	1meg				R100	470K			
R42	1meg				R101	2.2meg			
R43	1000Ω				R102	47K			
R44	10K				R103	47K			
R45	470K				R104	10K			
R46	1500Ω				R105	680K			
R47	100Ω				R106	100K			
R48	470K				R107	1000Ω			
R49	1meg				R108	4.7meg			
R50	27K				R109	100K			
R51	5600Ω				R110	2.2meg			
R52	10K				R111	62K			
R53	2.2meg				R112	68K			
R54	270K				R113	27K			
R55	1meg				R114	6800Ω			
R56	100K				R115	1000Ω			
R57	180Ω				R116	2200Ω			
R58	270Ω				R117	47K			
R59	56K				R118	680Ω			
R60	8200Ω				R119	100K			
R61	1meg				R120	10K			
R62	1000Ω				R121	33K			
R63	12K				R122	150K			
R64	8200Ω				R123	330Ω			
R65	1500Ω				R124	1000Ω			
R66	470K				R125	56K			
R67	2.2meg				R126	1meg			
R68	47K				R127	47K			
R69	47K				R128	3900Ω			
R70	10K				R129	47K			
R71	680K				R130	270K			
R72	100K				R131	1000Ω			
R73	1000Ω				R132	270K			
R74	4.7meg				R133	1000Ω			
R75	100K				R134	270Ω			
R76	2.2meg				R135	270Ω			
R77	62K				R136	250Ω 5W	PW5-250	5W-SQ-250	
R78	68K				R137	250Ω 5W	PW5-250	5W-SQ-250	
R79	27K				R138	100K			
R80	6800Ω				R139	22K			
R81	1000Ω				R140	10K			
R82	2200Ω				R141	50Ω 5W	PW5-50	5W-SQ-50	
R83	47K				R142	2700Ω			
R84	680Ω				R143	1800Ω			
R85	100K				R144	160Ω 20W	PW20-160	20W-SQ-160	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	BELL PART No.	REPLACEMENT DATA
K1	AM Diode RF Filter	100mmf, 100mmf, 47K	57A2	Aerovox PA-97 Centralab PC-50 Sprague D-1

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA BELL PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	NOTES
L1	FM Ant.	31A56					
L2	RF Choke (2uh)	31A59	BC-563	4606	RTC-8517	T857	
L3	RF Choke (5uh)	31A18	SW-631	4609	RTC-8519	T977	
L4	FM RF	31A58					
L5	FM Osc.	31A57					
L6	RF Choke (5uh)	31A18	SW-631	4609	RTC-8519	T977	
L7	RF Choke (1.2uh)	31A55	BC-561	4602	RTC-8515	T855	
L8	RF Choke (2.5uh)	31A22	BC-563	4606	RTC-8517	T857	
L9	Fil. Choke (1.2uh)	31A55	BC-561	4602	RTC-8515	T855	
L10	1st FM IF	32C81	FM-254	1463	RTC-8599	T633	
L11	2nd FM IF	32C81	FM-254	1463	RTC-8599	T633	
L12	3rd FM IF	32C81	FM-254	1463	RTC-8599	T633	
L13	Ratio Detector	32C86	FM-255	1465	RTC-8600	T635	
L14	AM Ant.	32C125					
L15	AM RF	32C126					
L16	AM Osc.	31A50	BC-393	70-OSC	RTC-8647	T512	
L17	1st AM IF	32C99	BC-352	12-C1	RTC-8632	T607	
L18	2nd AM IF	32C99	BC-353	12-C2	RTC-8633	T608	
L19	10KC Filter	31A63					
L20	Fil. Choke (3.8uh)	31A21	BC-564	4608	RTC-8518	T858	
L21	Fil. Choke(3.8uh)	31A21	BC-564	4608	RTC-8518	T858	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA BELL PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	117V @ 1.5A	640VCT @ .100A DC	320VCT @ .065A	32B118 ①					① Part #32B128 used in 50~ Version.
	SEC. 3	SEC. 4	SEC. 5						
	5V @ 1.9A	6.3V @ 4.8A	6.3V @ 3A						
	SEC. 6								
	120VCT @ .320V DC								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	SEC.	REPLACEMENT DATA BELL PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	9000Ω CT	16Ω Tap @	32B112					
	Tap @	8Ω, 4Ω						
	1600Ω CT							
T3	9000Ω CT	16Ω Tap @	32B112					
	Tap @	8Ω, 4Ω						
	1600Ω CT							

POWER RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA BELL PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.320A	42A13	1N1763	F4	SR500	Silicon Type
M2	.320A	42A13	1N1763	F4	SR500	Silicon Type

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA BELL PART No. FUSE	HOLDER	LITTELFUSE PART No. FUSE	HOLDER	BUSS PART No. FUSE	HOLDER
M3	3AG	2 8/10A 125V S/B	53X3	53A8	31302.8 (3AG 2 8/10A 125V S/B)	342001	MDL 2 8/10	HKP

MISCELLANEOUS

ITEM No.	PART NAME	BELL PART No.	NOTES
M4	Tuning Cap.	25B19	FM, 3 Gang
M5	Tuning Cap.	25B21	AM, 3 Gang (Ant. 14-366mmf, RF 27-286mmf, Osc. 20-127mmf)
M6	Switch	43B94	Function Selector (Rotary Wafer Type)
M7	Switch	43A67	AFC (SPDT Slide Type)
M8	Switch	43A45	Lo Filter (DPDT Slide Type)
M9	Switch	43A45	Hi Filter (DPDT Slide Type)
M10	Switch	43A83	Loudness Contour (Lever Type)
M11	Switch	43B42	Stereo Reverse (Lever Type)
M12	Meter	46A9	FM Tuning
M13	Meter	46A9	AM Tuning

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

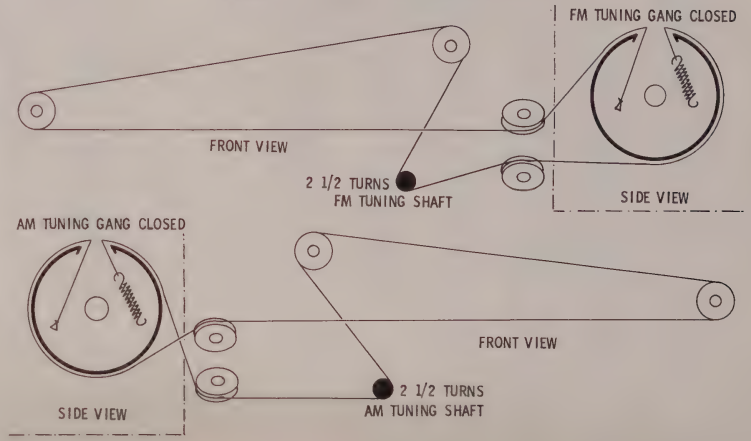
NAME	PART NO.	DESCRIPTION
Dial Glass	94C71	
Dial Pointer	77A72	
Knob	84A60	Tuning
Knob	84A59	Volume, Balance
Knob	84A61	Tone (4 Used)
Knob	84A70	Function Selector
Knob	84A62	Levers
Panel	72D437	Front

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

DIAL CORD STRINGING



PHOTOFACT® Folder with CIRCUITRACE®

CAPEHART MODEL T6-203

CAPEHART MODEL T6-203

CAPEHART MODEL T6-203

TRADE NAME	Capehart Model T6-203
MANUFACTURER	Capehart Corp., 87-46 123rd Street, Richmond Hill 18, L. I., N. Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC
RATING	5MA @ 9 Volts DC (No Signal, Min. Volume)
TUNING RANGE—BROADCAST	540 — 1600KC
	10MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A5.... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A4, A6..... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400% Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1600KC	1600KC	"	A4	"
3.	"	600KC	600KC	"	A5	"
4.	"	1400KC	1400KC Signal.	"	A6	Adjust for maximum output. Repeat Steps 2, 3 and 4.

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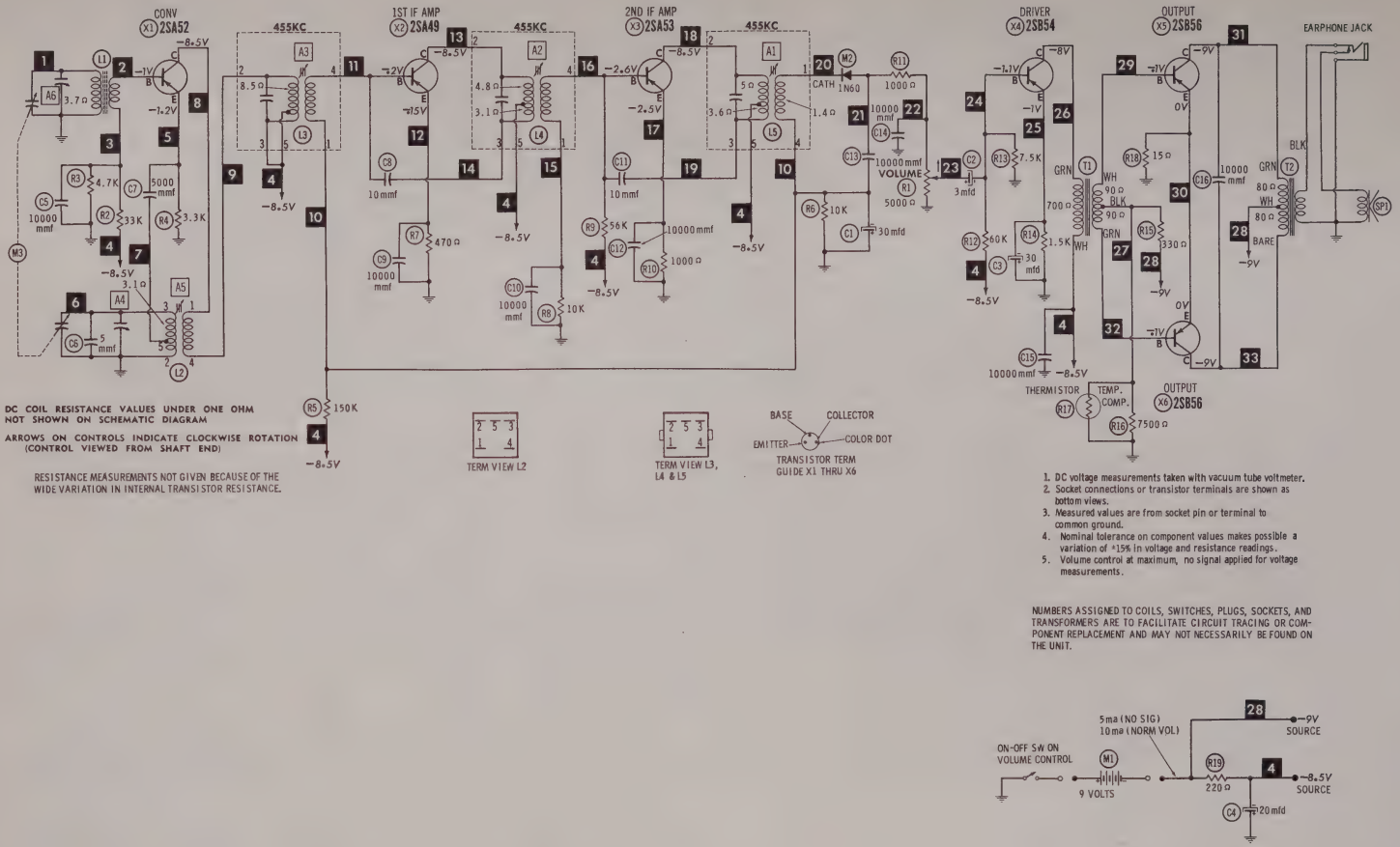
KF575

SET 541 FOLDER 7



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE®

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CAPEHART
MODEL T6-203

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2SA52	Converter				PNP
X2	2SA49	1st IF Amplifier				PNP
X3	2SA53	2nd IF Amplifier				PNP
X4	2SB54	Driver	2N406			PNP
X5	2SB56	Output	2N408			PNP
X6	2SB56	Output	2N408			PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	CAPEHART PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	30	3		PTT-3030	NLW30-6	TT6X30	MLV30-6	TE-1092	
C2	3	6		PTT-6003	NLW3-25	TT6X3	MLV2-12	TE-1082	
C3	30	3		PTT-3030	NLW30-6	TT6X30	MLV30-6	TE-1092	
C4	20	10		PTT-10020	NLW20-15	TT15X20	MLV20-12	TE-1130	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C6	5		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C7	5000		C80V502AM	DM-502	H-05D5	CCD-502	TA-250	TG-D50
C8	10		NPO-DI 10	DTZ-10	C10QIC	CCTO-100	CNO-410	10TCC-Q10
C9	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C10	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C11	10		NPO-DI 10	DTZ-10	C10QIC	CCTO-100	CNO-410	10TCC-Q10
C12	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C13	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C14	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C15	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C16	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CAPEHART PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/10		B16-214				Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	33K				R11	1000Ω			
R3	4700Ω				R12	60K			
R4	3300Ω				R13	7500Ω			
R5	150K				R14	1500Ω			
R6	10K				R15	330Ω			
R7	470Ω				R16	7500Ω			
R8	10K				R17	Temp. Comp.			
R9	56K				R18	15Ω			
R10	1000Ω				R19	220Ω			

PRINTED BOARD

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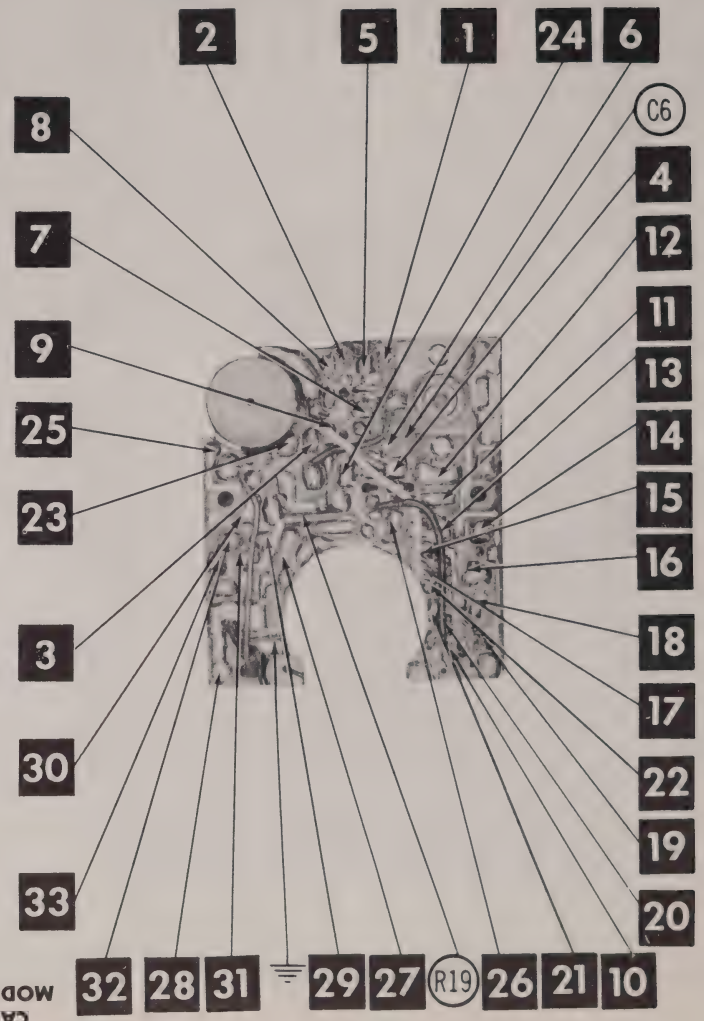


CAPEHART
MODEL T6-203

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		CAPEHART PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	Loopstick						
L2	Osc.						
L3	1st IF						
L4	2nd IF						
L5	3rd IF						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	CAPEHART PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.5	1						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	CAPEHART PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1500Ω CT	6-8Ω						

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	CAPEHART PART No.	QUAM PART No.	
SP1	2"	PM	6-8Ω			

BATTERIES

ITEM No.	VOLTAGE	CAPEHART PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			2U6		216		M-1604	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		CAPEHART PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N60			1N60	1N60	Detector (Pigtail)

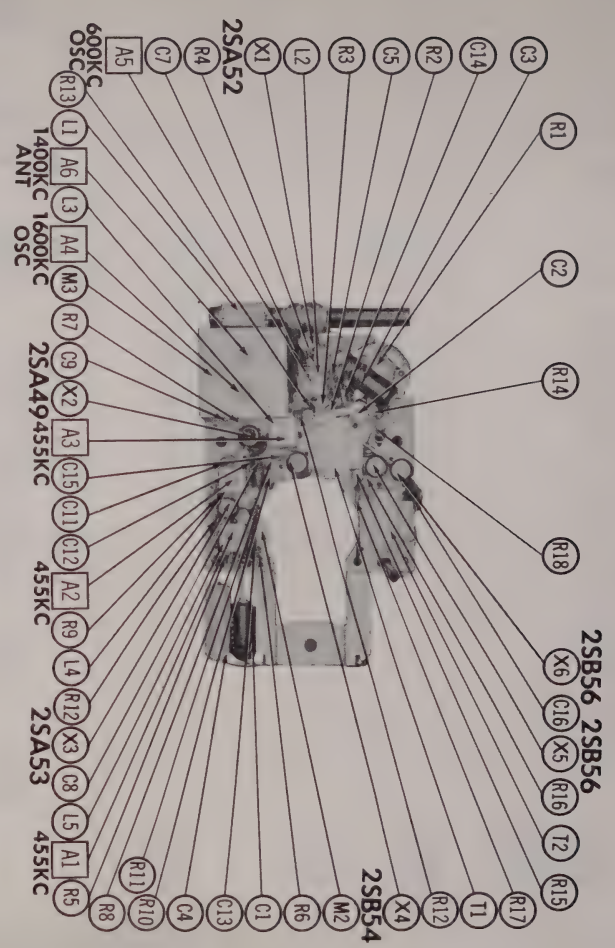
MISCELLANEOUS

ITEM No.	PART NAME	CAPEHART PART No.	NOTES
M3	Tuning Cap.		2 Gang

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

PHOTOFACT® Folder

GOLDEN SHIELD MODELS 600, 601, 629, 650, 651, 653, 657

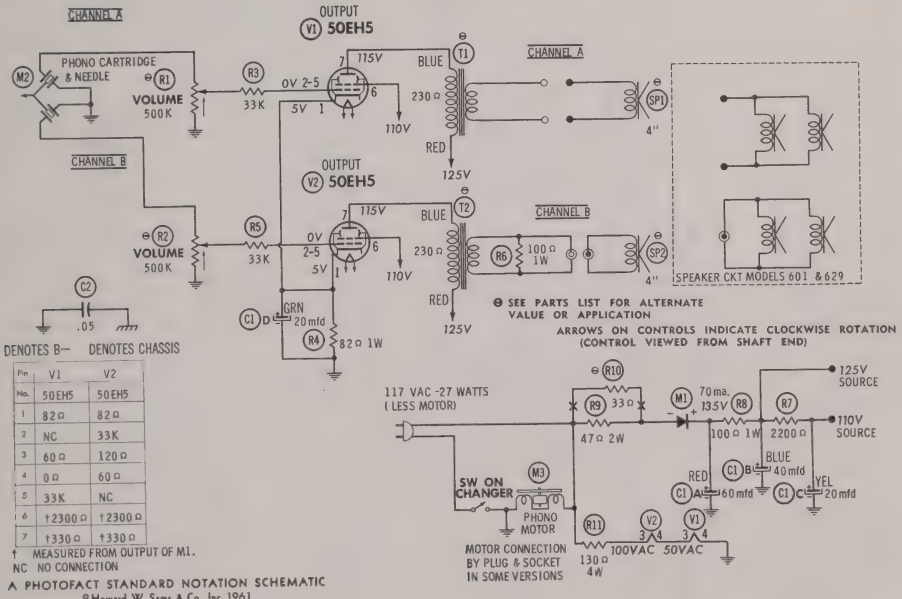
GOLDEN SHIELD MODELS 600, 601, 629, 650, 651, 653, 657

MODEL 657

GOLDEN SHIELD MODELS 600, 601, 629, 650, 651, 653, 657

TRADE NAME	Golden Shield Models 600, 601, 629, 650, 651, 653, 657
SUPPLIER	Golden Shield Corp., Service Dept., 700 Ellicott Street, Batavia, N. Y.
TYPE SET	AC Operated 2 Tube Stereo Phono Amplifier
POWER SUPPLY	110 – 120 Volts AC, 60 Cycles RATING 27 Watts, .26 Amp. @117 Volts AC (Less Motor)

MODELS 600, 601, 629 HAVE 3 SPEED MANUAL RECORD PLAYER:
MODELS 650, 651, 653, 657 HAVE 4 SPEED AUTOMATIC RECORD CHANGER. – FOR SERVICE INFORMATION – SEE SIMILAR MONARCH UA12 – PHOTOFACT SET 465 FOLDER 6



Pin No.	V1	V2
1	82Ω	82Ω
2	NC	33K
3	60Ω	120Ω
4	0Ω	60Ω
5	33K	NC
6	†2300Ω	†2300Ω
7	†330Ω	†330Ω

† MEASURED FROM OUTPUT OF M1.
NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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SET 541 FOLDER 8

PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •		RAYTHEON •		SYLVANIA •	
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel A Output	50EH5	V2	Channel B Output	50EH5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Golden Shield PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	60	150	161-4031	PR4-200	BBRQ0174	TCT3119 TC45	CDBQ-4422	TVA-4618	
B	40	150							
C	20	150							
D	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Golden Shield PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	153-0211 ①	B-60	A47-500K-Z	Q13-133	U48	Volume, Channel A
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	500K	½	153-0211	B-60	A47-500K-Z	Q13-133	U48	Volume, Channel B
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

① Models 600, 601, 629 use Part #153-0233 (with switch).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R3	33K			
R4	82Ω 1W			
R5	33K			
R6	100Ω 1W			
R7	2200Ω			

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R8	100Ω 1W			
R9	47Ω 2W			
R10	33Ω			
R11	130Ω 4W	PW5-130	5W-SQ-130	

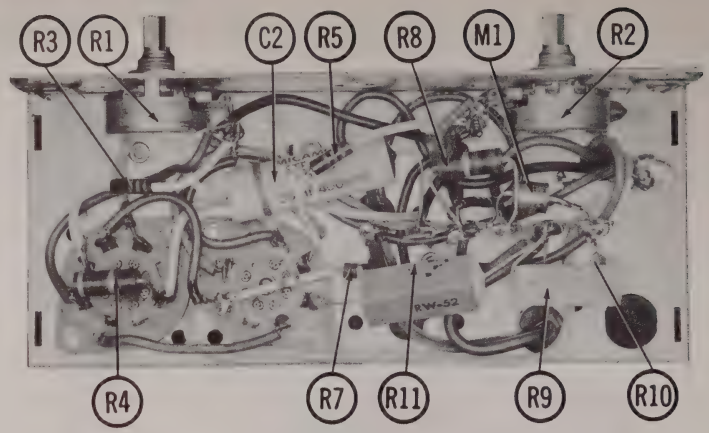
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Golden Shield PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2500Ω	3-4Ω	143-0087 ①	A-3025 ②	A-3332 ②	26S58	S-12Z	① Part #143-0094 used in Models 600, 601, 629
T2	2500Ω	3-4Ω	143-0087 ①	A-3025 ②	A-3332 ②	26S58	S-12Z	② Drill New Mounting Hole(s).

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA Golden Shield PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	SP-401 *	4A07	* Models 650, 651, 653, 657
SP2	4"	PM	3-4Ω	SP-401 *	4A07	✝ Models 600, 601, 629
	4"	PM	3-4Ω	539-0403 ✝	4A07	

CHASSIS—BOTTOM VIEW



POWER RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Golden Shield PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.070A	517-0024	1N1763	2F4	SR200	

PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	Golden Shield PART No. CARTRIDGE	Golden Shield PART No. NEEDLE*	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE*	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE*	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE*	NOTES
M2	916-0020	902-0017* (LP)	76-TS-TB	N8-7*	96T	Not Req.	12TH-S	Not Req.	Models 650, 651, 653, 657
		902-0016* (78RPM)		N8-3*					
	916-0017	902-0012* (LP)	70-TS-TB	N8-1*	96T	Not Req.	12TH-S	Not Req.	Models 600, 601, 629
		902-0013 * (78RPM)		N8-3 *					

MISCELLANEOUS

ITEM No.	PART NAME	Golden Shield PART No.	NOTES
M3	Motor	924-0018	3 Speed (Alliance) Models 600, 601, 624 only
	Spindle	922-0019	45 RPM, Models 650, 651, 653, 657

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)

PHOTOFACT® Folder

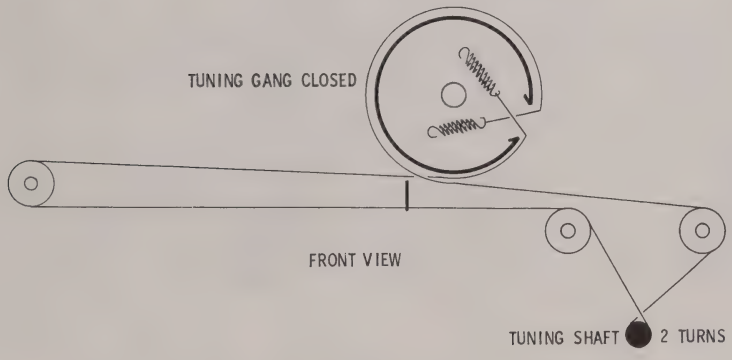
GRUNDIG MAJESTIC MODEL 92US

GRUNDIG MAJESTIC
MODEL 92US

GRUNDIG MAJESTIC
MODEL 92US

TRADE NAME	Grundig Majestic Model 92US		
IMPORTER	Majestic International Sales, 743 N. LaSalle Street, Chicago 10, Illinois		
TYPE SET	AC Operated 3 Tube FM-AM Receiver		
POWER SUPPLY	110-120 / 220 Volts AC, 60 Cycles	RATING	30 Watts, .3 Amp. @117 Volts AC
TUNING RANGE—BROADCAST	540 — 1600KC	FREQ. MOD.	88-108MC

DIAL CORD STRINGING



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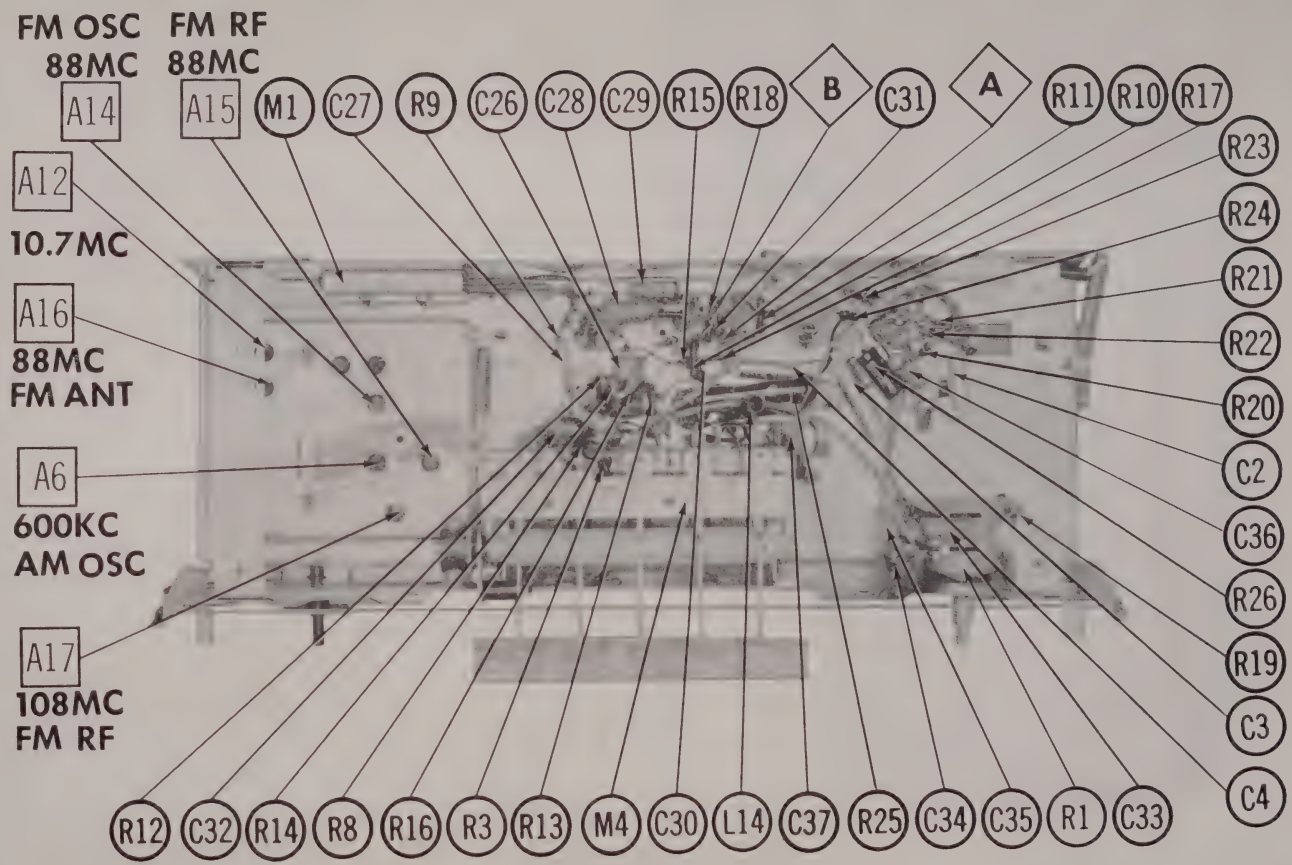
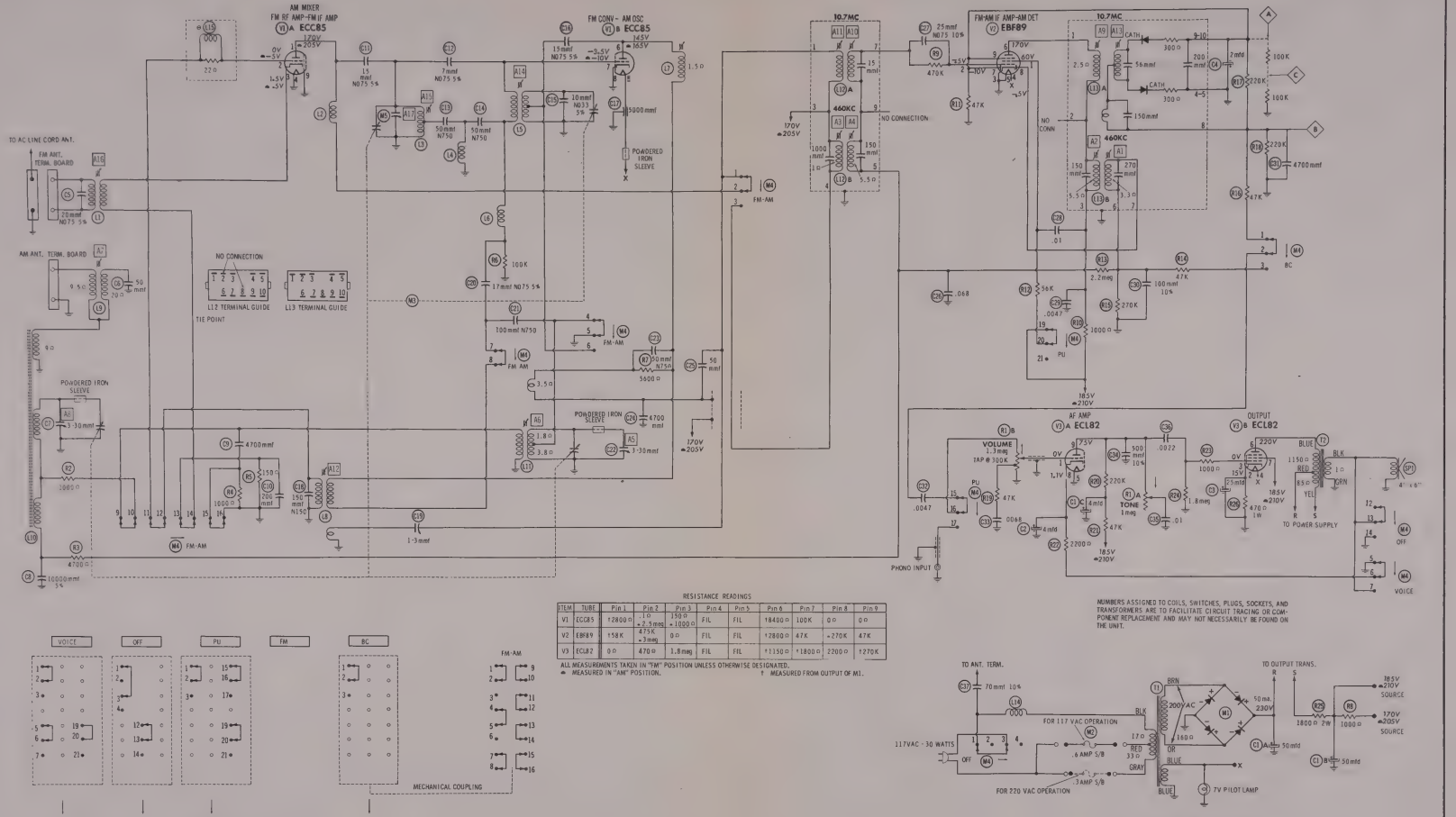
KK632

SET 541 FOLDER 9



CHASSIS-BOTTOM VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85	†2800Ω	1Ω •2.5meg	150Ω •1000Ω	FIL	FIL	†8400Ω	100K	0Ω	0Ω
V2	EBF89	158K	475K •3meg	0Ω	FIL	FIL	†2800Ω	47K	•270K	47K
V3	ECL82	0Ω	470Ω	1.8meg	FIL	FIL	†1150Ω	†1800Ω	2200Ω	†270K

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
• MEASURED IN "AM" POSITION. † MEASURED FROM OUTPUT OF M1.

MUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

SELECTOR SWITCH (M4) SHOWN IN FM POSITION.

PRESSING PU, FM OR BC TURNS SET ON
PRESSING BC MOVES FM-AM SW. TO AM POSITION
PRESSING OFF, PU OR FM MOVES FM-AM SW. TO FM

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum; no signal applied for voltage measurements.

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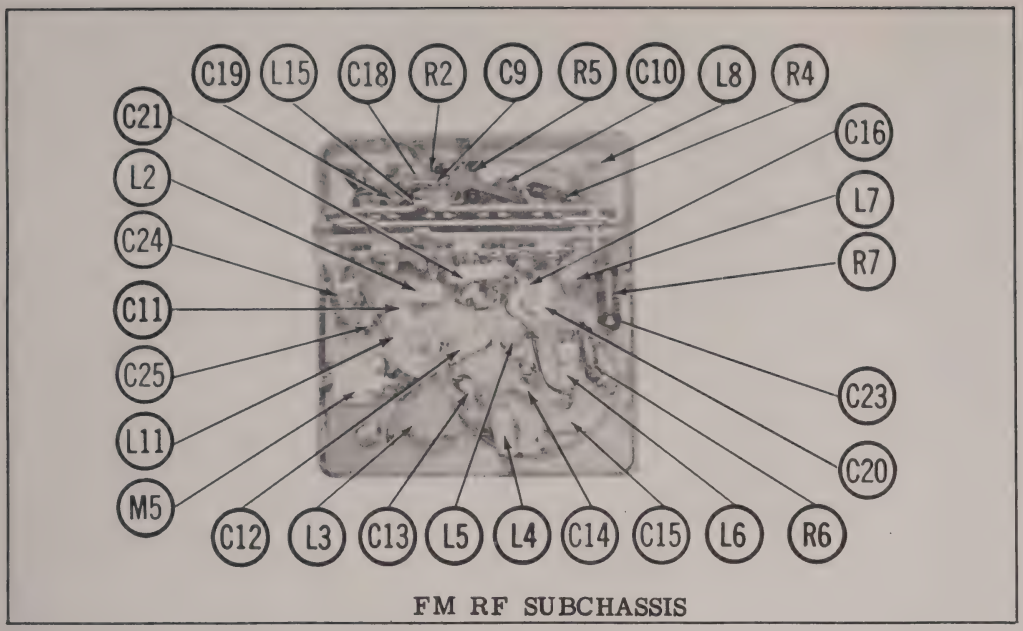
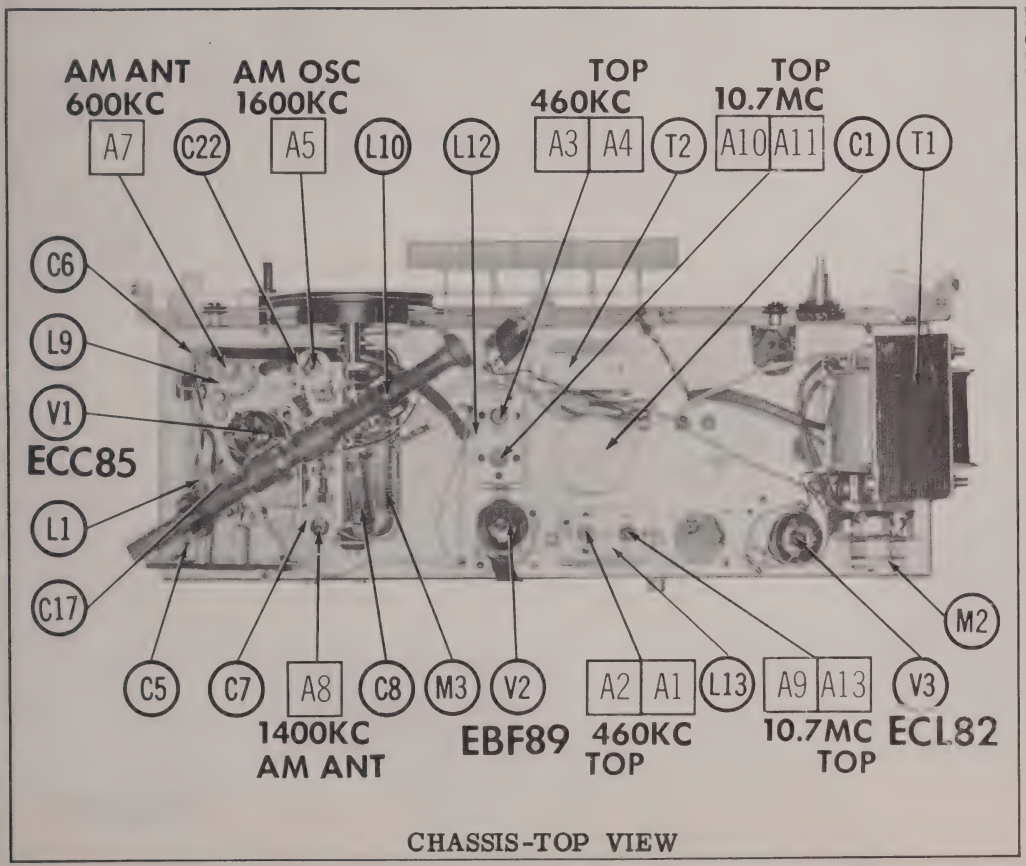
GRUNDIG MAJESTIC MODEL 92U5



FM RF SUBCHASSIS



CHASSIS-TOP VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.
Suggested Alignment Tools: A1 thru A4, A7, A9 thru A13.... GENERAL CEMENT #8607, 9291, 9294
WALSCO #2520, 2522, 2523, 2524, 2534, 2537, 2538
A17..... GENERAL CEMENT #8721, 8722
WALSCO #2519

AM ALIGNMENT — SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 2 (grid) of AM Converter. Low side to chassis.	460KC (400~ 30% AM)	(AM) Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	High side to AM antenna terminals. Low side to chassis.	1600KC	1600KC	"	A5	"
3.	"	600KC	600KC	"	A6, A7	"
4.	"	1400KC	1400KC Signal.	"	A8	Adjust for maximum output. Repeat Steps 2, 3 and 4.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM — SELECTOR IN FM POSITION

Connect two matched 100K (±1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .05mfd to pin 7 (grid) of FM Converter. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe to point Ⓐ. Common to chassis.	A9, A10, A11, A12	Adjust for maximum deflection.
6.	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE—SELECTOR IN FM POSITION

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	Hifh side thru .05mfd to pin 7 (grid) of FM Converter. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. to point Ⓐ. Low side to chassis.	A9, A10, A11, A12	Disconnect stabilizing capacitor C4. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C4.
6.	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A13	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A9 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT — SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	Across FM antenna terminals.	88MC (Unmod.)	(FM) 88MC	DC probe to point Ⓐ. Common to chassis.	A14, A15, A16	Adjust for maximum deflection.
8.	"	108MC	108MC	"	A17	"

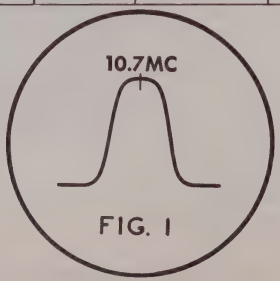


FIG. 1

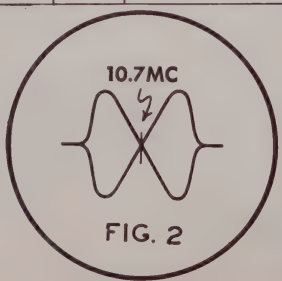


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE
V1	FM RF Amp. -FM Conv. - FM IF Amp. -AM Mixer- AM Osc.	ECC85
V2	FM-AM IF Amp. -AM Det.	EBF89
V3	AF Amp. -Output	ECL82

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	GRUNDIG PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg	1/2	7801-256					Tone
B	1, 3meg 300K Tap	1/2						Volume

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	GRUNDIG PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	50	350						TVAS-3620*	
B	50	350							
C	4	350							
C2	4	12		PRS1400	NLW4-15	TT50X4	TD-4-25	TE-1123	
C3	25	25		PRS1260	NLW25-25	TT25X25	TD-25-25	TE-1207	
C4	2	70		PRS1705	NLW2-100	TT150X2	MLV2-100	TE-1401	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	20 N075 5%					*		
C6	50		SI 50	D6-500	L10Q5	CCD-500	GP450	10TS-Q50
C7	3-30							
C8	10000 5%				10R5S1			
C9	4700		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47
C10	200		DI-200	D6-201	L10T2	CCD-201	GP320	10TS-T20
C11	15 N075 5%					*		
C12	7 N075 5%					*		
C13	50 N750		N750-SI 50	TCN-50	C10Q5U	CCTN-47Q	CN7-447	10TCU-Q47
C14	50 N750		N750-SI 50	TCN-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C15	10 N033 5%					*		
C16	15 N075 5%					*		
C17	5000							
C18	150 N150					*		10TCP-T15
C19	1-3							
C20	17 N075 5%					*		
C21	100 N750		N750-SI 100	TCN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C22	3-30							
C23	50 N750		N750-SI 50	TCN-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C24	4700		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47
C25	50		SI 50	D6-500	L10Q50	CCD-500	GP450	10TS-Q50
C26	.068 250V		P488N-068		CUB4S68	4DP-3-683	GEM-4168	4TM-S68
C27	25 N075 10%					*		
C28	.01 500V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S10
C29	.0047 500V		P688N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C30	100 10%		NPO-SI 100	D6-101	L10T1	CCD-101	GP310	10TS-T10
C31	4700		SI 4700	D6-472	BYA10D47	CCD-472	B-247	5HK-D47
C32	.0047 500V		P688N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C33	.0068 500V			D6-682	CUB6D68	6DP-1-682	GEM-6268	6TM-D68
C34	500 10%			D6-501	PM6T5	CCD-501	GP350	10TS-T50
C35	.01 500V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S10
C36	.0022 500V		P688N-0022	D6-222	CUB6D22	6DP-1-222	GEM-622	6TM-D22
C37	70 10%		NPO-SI 68	D6-680	L10Q68	CCD-680	GP468	10TS-Q68

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	1000Ω				R15	270K			
R3	4700Ω				R16	47K			
R4	1000Ω				R17	220K			
R5	150Ω				R18	220K			
R6	100K				R19	47K			
R7	5600Ω				R20	220K			
R8	1000Ω				R21	47K			
R9	470K				R22	2200Ω			
R10	1000Ω				R23	1000Ω			
R11	47K				R24	1, 8meg			
R12	56K				R25	1800Ω 2W			
R13	2, 2meg				R26	470Ω 1W			
R14	47K								

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		GRUNDIG PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	FM Ant.	9208-004					① Wound on 22Ω
L2	RF Choke	BV1975					
L3	FM RF	9226-016					
L4	RF Choke	BV1975					
L5	FM Osc.	9226-017					
L6	RF Choke	BV1976					
L7	Trap	9226-014					
L8	1st FM IF	9226-015					
L9	AM Ant.	9208-068					
L10	Loopstick	9233-005					
L11	AM Osc.	9226-018					
L12A	1st AM IF	FI7207-321					
B	2nd FM IF						
L13A	Ratio Detector	FII 7207-339					
B	2nd AM IF						
L14	Line Choke	9238-080					
L15	RF Choke	9239-003 ①					

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	GRUNDIG PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	220V, Tap @ 117V @ .3A	200V @ .090A AC	6.3V @ 1.4A	BV9072-004					

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	GRUNDIG PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	9800Ω Tap @ 7.5%	2-3Ω	BV9038-031					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	GRUNDIG PART No.	QUAM PART No.	
SP1	4"x 6"	PM	2-3Ω	1044/1K	46A15	

POWER RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	GRUNDIG PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.050A	B250C60 *				* Selenium, Bridge Type

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			GRUNDIG PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2		.6A 117V					GMA 7/10	

MISCELLANEOUS

ITEM No.	PART NAME	GRUNDIG PART No.	NOTES
M3	Tuning Cap.	9653-408	FM-AM, 4 Gang
M4	Switch		Function Selector, Pushbutton Type
M5	Variable Cap.		1.3-5mmf

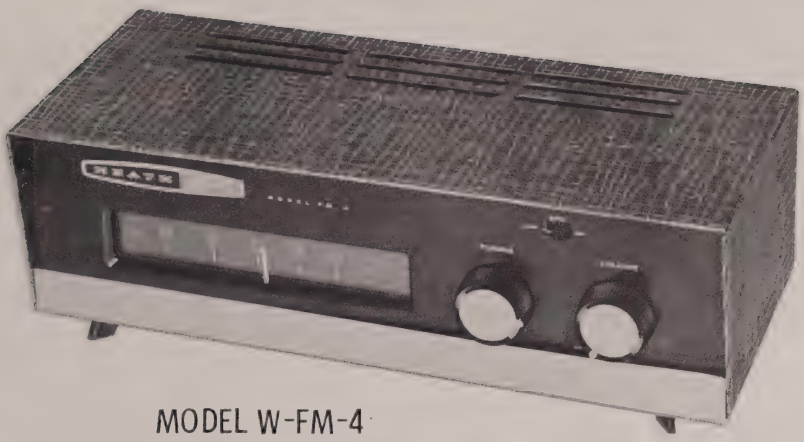
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder

HEATH
MODELS FM-4, W-FM-4

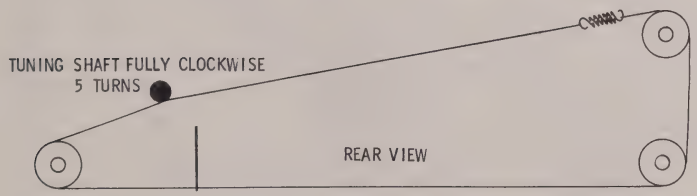


MODEL W-FM-4

HEATH
MODELS FM-4, W-FM-4

TRADE NAME	Heath Models FM-4 (Kit), W-FM-4 (Wired)
MANUFACTURER	Heath Co., A Subsidiary of Daystrom, Inc., Benton Harbor, Michigan
TYPE SET	AC Operated 5 Tube FM Tuner
POWER SUPPLY	110 – 120 Volts AC, 50-60 Cycles RATING 21 Watts, .2 Amp. @117 Volts AC
TUNING RANGE	88 – 108MC

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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KJ629

SET 541 FOLDER 10

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.
Suggested Alignment Tools: A1 thru A5 and A8....GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A6, A7..... GENERAL CEMENT #9296, 9297
WALSCO #2546, 2547

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

AFC "Off".

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	Across antenna terminals.	10.7MC (Unmod.)	Point of non-interference.	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4, A5, A6, A7	Adjust for maximum deflection.
2.	"	"	"	DC probe to point Ⓑ. Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

AFC "Off".

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	Across antenna terminals.	10.7MC (450KC Swp)	Point of non-interference.	Vert. amp. to point Ⓐ. Low side to chassis.	A1, A2, A3, A4, A5, A6, A7	Disconnect stabilizing capacitor C5. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C5.
2.	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A8	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A1 for maximum amplitude and straightness of cross-over lines.

RF ALIGNMENT

This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.

FIG. 1

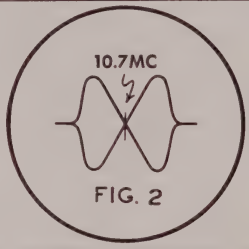
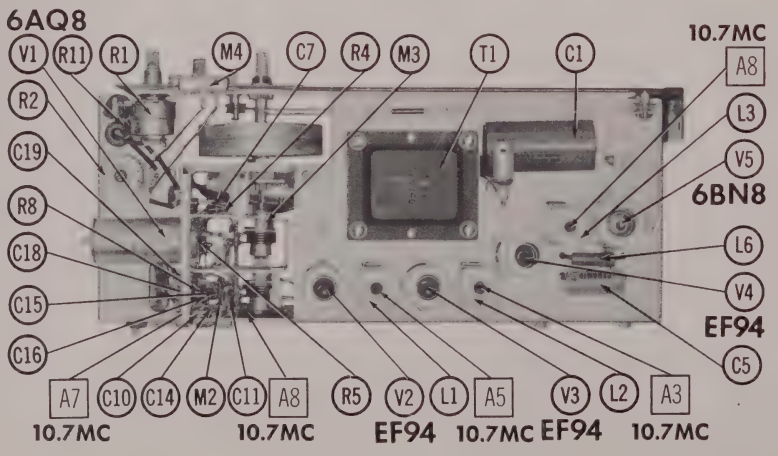
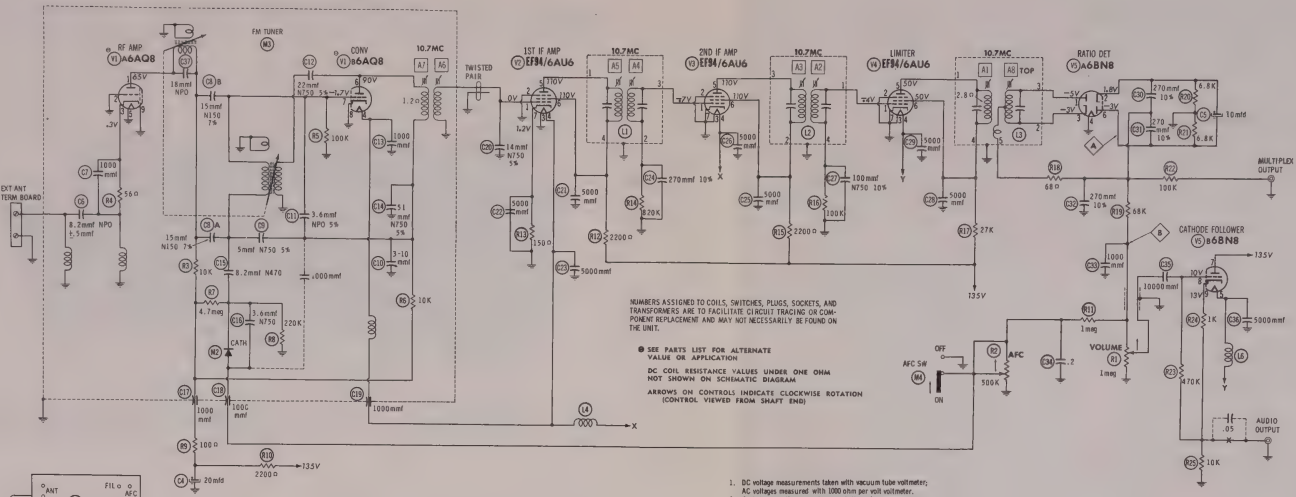
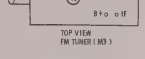


FIG. 2



CHASSIS—TOP VIEW


FM TUNER
RF AMP V1 6AQ8
CONV V1 6AQ8
10.7MC
TWISTED PAIR
1ST IF AMP V2 EF94/6AU6
2ND IF AMP V3 EF94/6AU6
LIMITER V4 EF94/6AU6
RATIO DET V5 A6BN8
EXT ANT TERM BOARD
MULTIPLEX OUTPUT
CATHODE FOLLOWER V5 6BN8
AFC SW M4
OFF
ON
AFC
VOLUME
AUDIO OUTPUT
135V
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)



TOP VIEW FM TUNER (M3)

TERM VIEW L1 & L2

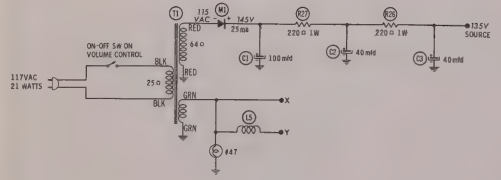
TERM VIEW L3

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±1% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	†Pin 7	Pin 8	Pin 9
V1	6AQ8	†12K	0Ω	56Ω	FIL	FIL	†12K	100K	0Ω	0Ω
V2	EF94 6AU6	.1Ω	0Ω	FIL	FIL	†2600Ω	†2600Ω	150Ω		
V3	EF94 6AU6	820K	0Ω	FIL	FIL	†2600Ω	†2600Ω	0Ω		
V4	EF94 6AU6	100K	0Ω	FIL	FIL	†27K	†27K	0Ω		
V5	6BN8	570K	6800Ω	570K	FIL	FIL	6800Ω	†440Ω	480K	11K

† MEASURED FROM OUTPUT OF M1.



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PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •			• RAYTHEON • SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	RF Amp. -Converter	6AQ8 (6DT8) *	V4	Limiter	EF94/6AU6
V2	1st IF Amplifier	EF94/6AU6	V5	Ratio Det. -Cath. Foll.	6BN8
V3	2nd IF Amplifier	EF94/6AU6			

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	HEATH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	100	200	25-57	PRS1595	BR10035	TC1265	TD-100-200	TVA-1718	
C2	40	150	25-20	PRS1470	BR4015	TC48	TD-40-150	TVA-1413	
C3	40	150	25-20	PRS1470	BR4015	TC48	TD-40-150	TVA-1413	
C4	20	150	25-19	PRS1440	BBR20-150	TC45	TD-20-150	TVA-1410	
C5	10	25	25-4	PRS1250	BBR10-25	TC22	TD-10-25	TVA-1204	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	8.2 NPO ± .5mmf		NPO-DI 8.2		C10V82C			10TCC-V82
C7	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C8A	15 N150 7%					*		10TCP-Q15
B	15 N150 7%					*		10TCP-Q15
C9	5 N750 5%			DTN-5	C10V5U	CCTN-050	CN7-550	10TCU-V50
C10	3-10			829-10				
C11	3.6 NPO 5%		NPO-DI 3.3	DTZ-3R3	C10V33C	CCTO-3R3	CNO-533	10TCC-V33
C12	22 N750 5%		N750-DI 22	DTN-22	C10Q22U	CCTN-220	CN7-422	10TCC-Q22
C13	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C14	51 N750 5%			TCN-51	C10Q51U			
C15	8.2 N470					*		
C16	3.6 N750			TCN-3R3			CN7-533	10TCU-V33
C17	1000		EF-001	MFT-1000		CCF-102	CT280A	
C18	1000		EF-001	MFT-1000		CCF-102	CT280A	
C19	1000		EF-001	MFT-1000		CCF-102	CT280A	
C20	14 N750 5%		N750-DI 15	TCN-15	C10Q15U	CCTN-150	CN7-415	10TCU-Q15
C21	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C22	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C23	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C24	270 10%		DI-270	DD-271	L10T27	CCD-271	GP327	10TS-T27
C25	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C26	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C27	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C28	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C29	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C30	270 10%		DI-270	DD-271	L10T27	CCD-271	GP327	10TS-T27
C31	270 10%		DI-270	DD-271	L10T27	CCD-271	GP327	10TS-T27
C32	270 10%		DI-270	DD-271	L10T27	CCD-271	GP327	10TS-T27
C33	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C34	.2 50V		P288N-2		CUB2P2	IDP-3-204	GEM-2022	2TM-P22
C35	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C36	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C37	18 NPO		NPO-DI 18	TCZ-18	C10Q18C	CCTO-180	CNO-418	10TCC-Q18

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	HEATH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg	½	19-44	B-70-S	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-26	Power Off-On
R2A	500K	½	10-60	TT-59	B47-500K-S	B11-133	TA55L	AFC
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R3	10K				R16	100K			
R4	56Ω				R17	27K			
R5	100K				R18	68Ω			
R6	10K				R19	68K			
R7	4.7meg				R20	6800Ω			
R8	220K				R21	6800Ω			
R9	100Ω				R22	100K			
R10	2200Ω				R23	470K			
R11	1meg				R24	1000Ω			
R12	2200Ω				R25	10K			
R13	150Ω				R26	220Ω 1W			
R14	820K				R27	220Ω 1W			
R15	2200Ω								

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		HEATH PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	2nd IF	52-26	FM-254	1463	RTC-8599	T633	
L2	3rd IF	52-27	FM-254	1463	RTC-8599	T633	
L3	Ratio Detector	53-4	FM-255	1465	RTC-8600	T635	
L4	Fil. Choke(1.7uh)	45-35	BC-562	4604	RTC-8516	T856	
L5	Fil. Choke (1.7uh)	45-35	BC-562	4604	RTC-8516	T856	
L6	Fil. Choke (1.7uh)	45-35	BC-562	4604	RTC-8516	T856	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	HEATH PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V@ .2A	115V@ .025A DC	6.3V@ 1.9A	54-81					

POWER RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	HEATH PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.025A	57-23	1N1763	2F4	SR200	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		HEATH PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2						AFC Diode (Part of M3)

MISCELLANEOUS

ITEM No.	PART NAME	HEATH PART No.	NOTES
M3	FM Tuner	110-1	Complete
M4	Switch	60-1	AFC (SPDT Slide Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

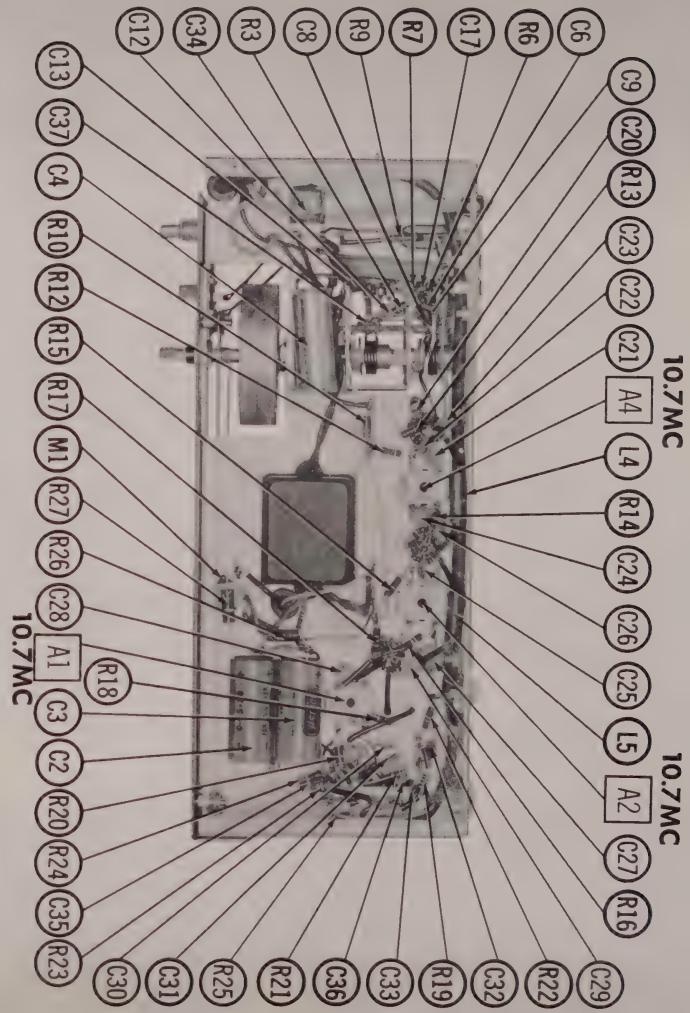
NAME	PART NO.	DESCRIPTION
Knob	462-78	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW

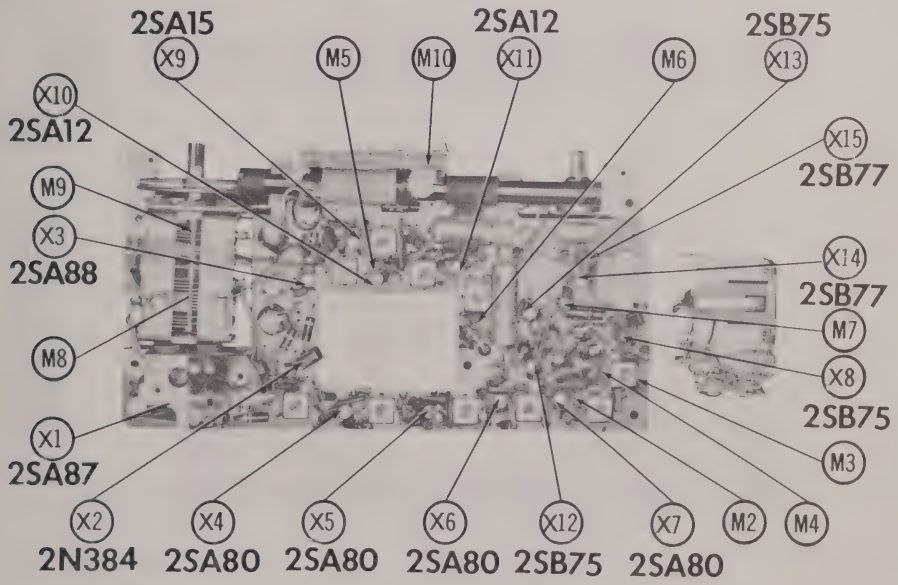


PHOTOFACT® Folder with CIRCUITRACE®

HITACHI
MODEL XH-1500

HITACHI
MODEL XH-1500

TRADE NAME	Hitachi Model XH-1500		
IMPORTER	Electronic Utilities Co., Div. of the Sampson Co., 2244 S. Western Ave., Chicago 8, Illinois		
TYPE SET	Battery Operated Transistorized Portable FM-AM Receiver		
POWER SUPPLY	9 Volts DC	RATING	AM: 8MA @ 9 Volts DC (No Signal, Min. Volume) AM: 20MA @ 9 Volts DC (Signal, Normal Volume) FM: 11MA @ 9 Volts DC (No Signal, Min. Volume) FM: 23MA @ 9 Volts DC (Signal, Normal Volume)
TUNING RANGE	BROADCAST 535-1605KC FREQ. MOD. 88-108MC		



HITACHI
MODEL XH-1500

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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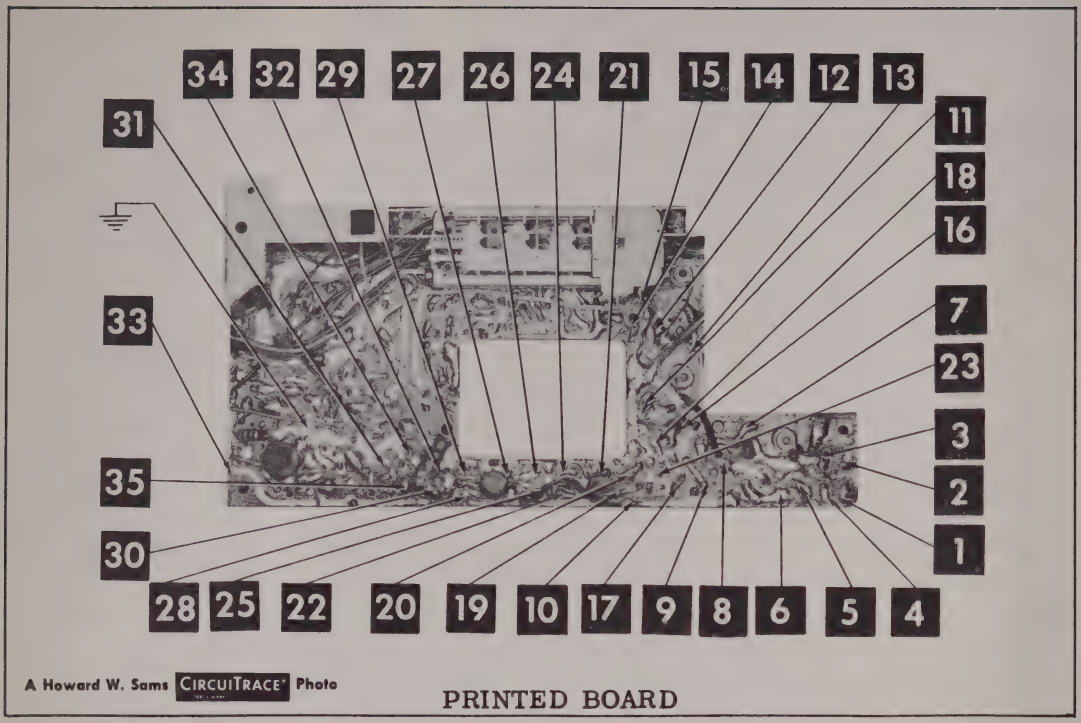
KF567

SET 541 FOLDER 11



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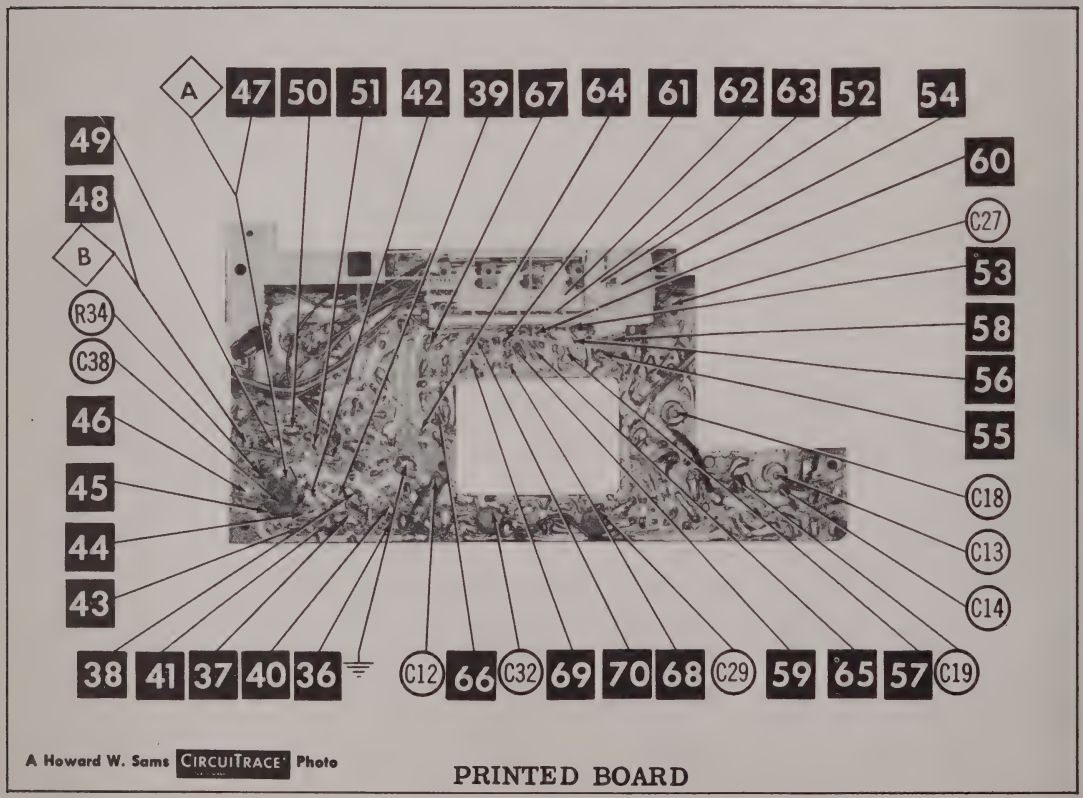
PRINTED BOARD



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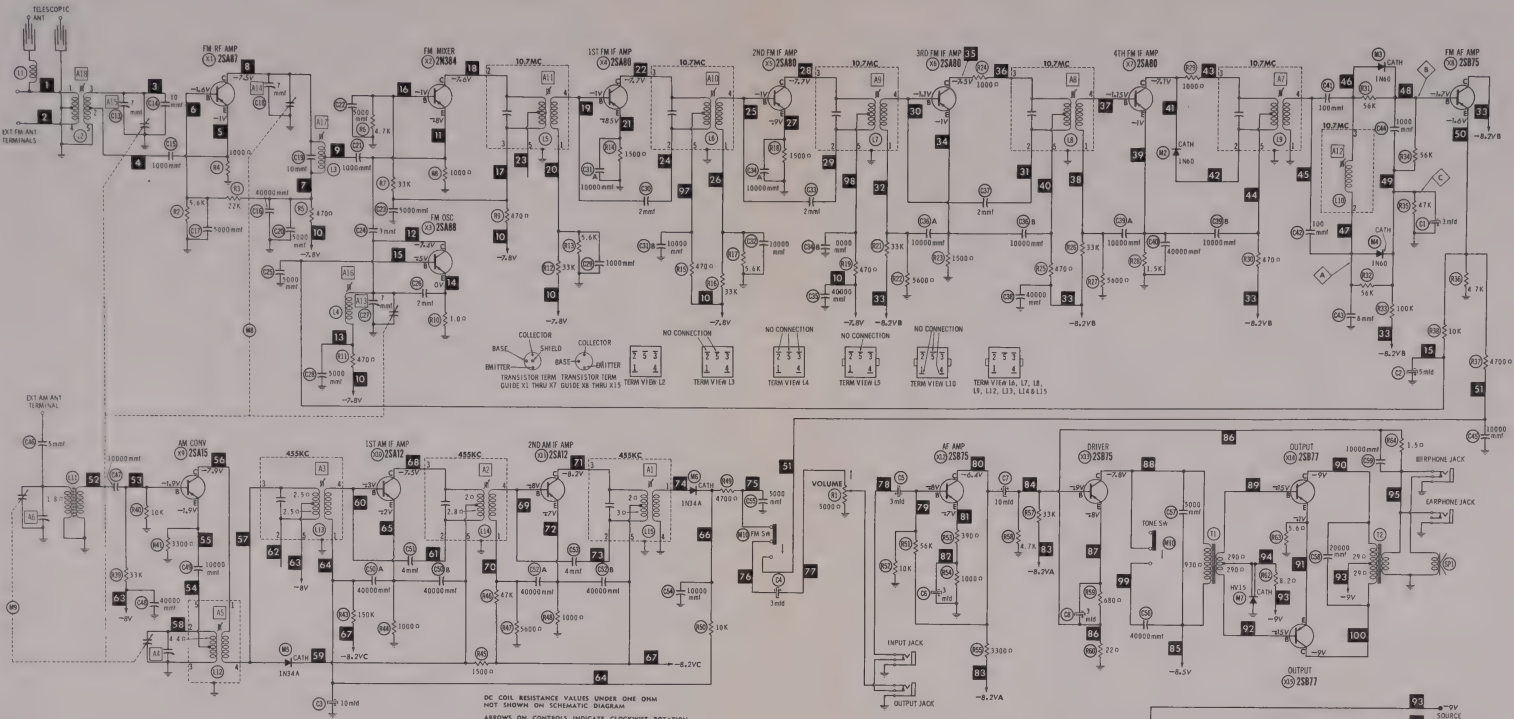
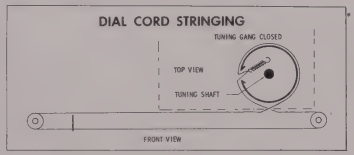

TELESCOPIC ANT
EXT FM ANT TERMINALS
FM RF AMP X1 2SA87
FM MIXER X2 2N384
FM OSC X3 2SA88
10.7MC
1ST FM IF AMP X4 2SA80
2ND FM IF AMP X5 2SA80
3RD FM IF AMP X6 2SA80
4TH FM IF AMP X7 2SA80
FM AF AMP X8 2SB75
EXT AM ANT TERMINAL
AM CONV X9 2SA15
455KC
1ST AM IF AMP X10 2SA12
2ND AM IF AMP X11 2SA12
1N34A
VOLUME
AF AMP X12 2SB75
DRIVER X13 2SB75
OUTPUT X14 2SB77
OUTPUT X15 2SB77
TONE SW
EARPHONE JACK
INPUT JACK
OUTPUT JACK
TRANSISTOR TERM GUIDE X1 THRU X7
TRANSISTOR TERM GUIDE X8 THRU X15
TERM VIEW L2
TERM VIEW L3
TERM VIEW L4
TERM VIEW L5
TERM VIEW L10
TERM VIEW L6, L7, L8, L9, L12, L13, L14 & L15
NO CONNECTION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
8 ma I MIN VOLU AM
11 ma I MIN VOLU FM
22 ma I NORMAL VOLU AM
23 ma I NORMAL VOLU FM
9 VOLTS TOTAL
DIAL LIGHT SW
DIAL LIGHTS
POWER SW
AM SW
OPERATED BY ADAPTER PLUG
AC ADAPTER SOCKET
PUSHBUTTONS (M10) SHOWN WITH "AM" BUTTON DEPRESSED
-9V SOURCE
-8.5V SOURCE
-8.2VA SOURCE
-8.2VB SOURCE
-7.8V SOURCE
-8.2VC SOURCE
-8V SOURCE

DIAL CORD STRINGING



A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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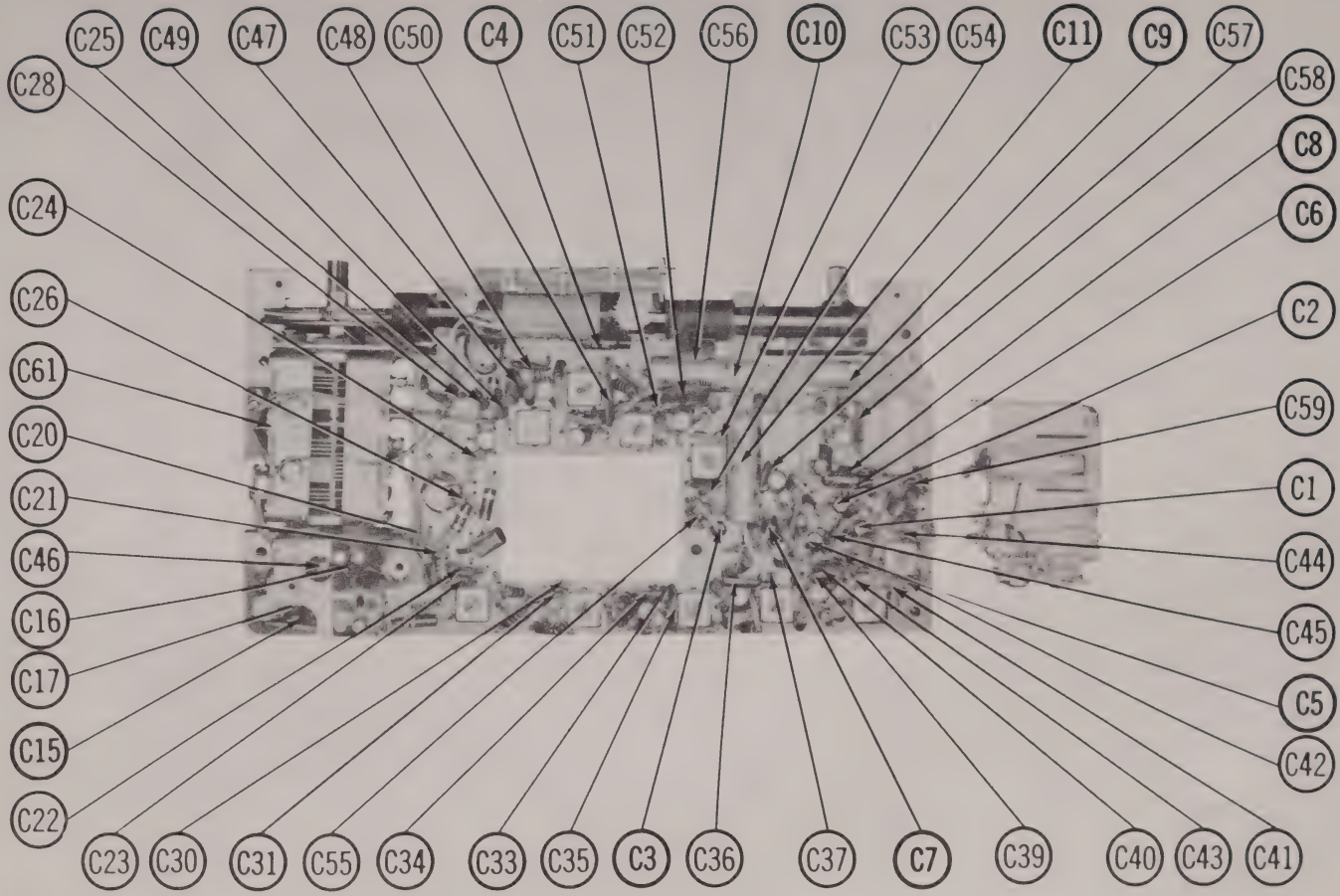
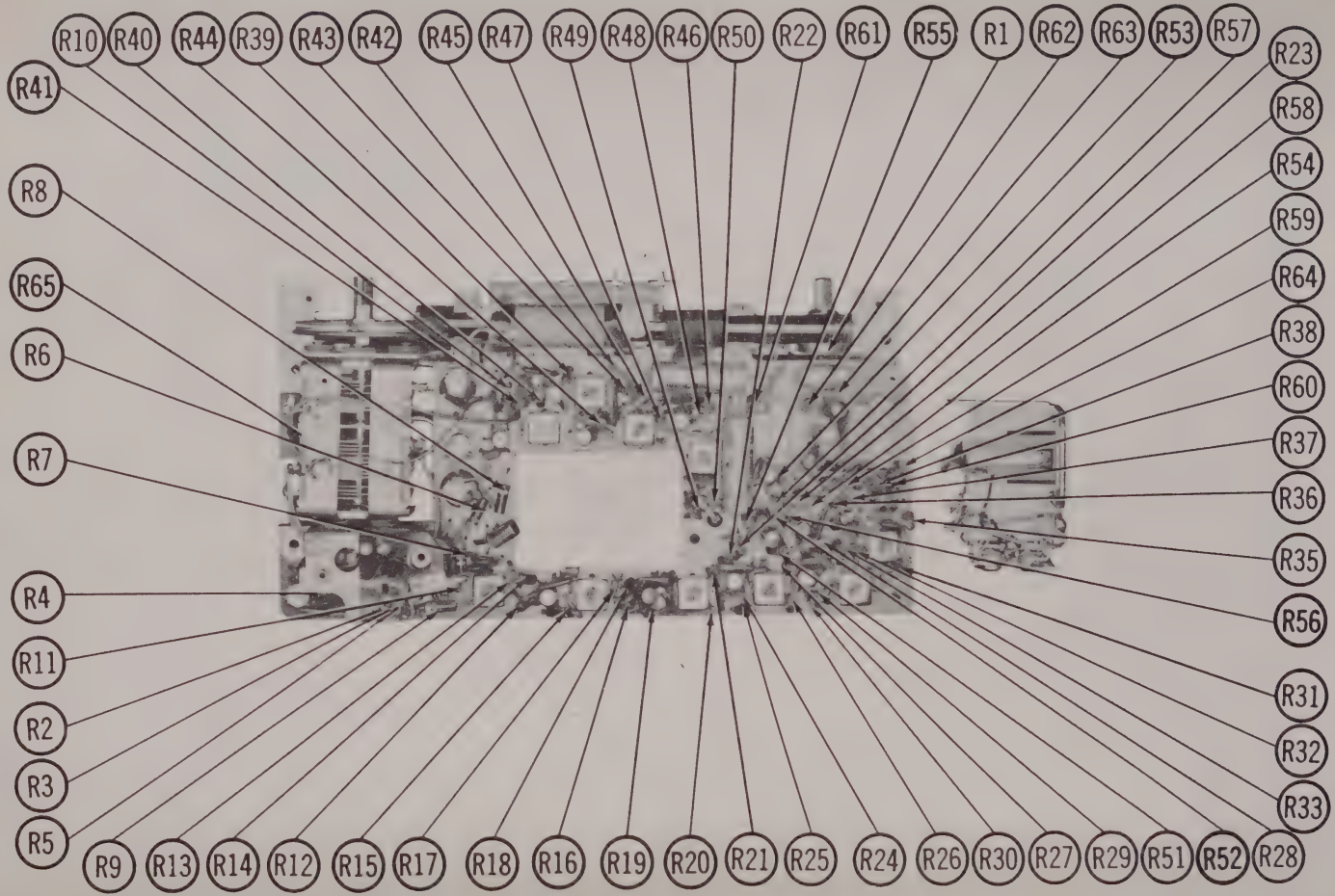
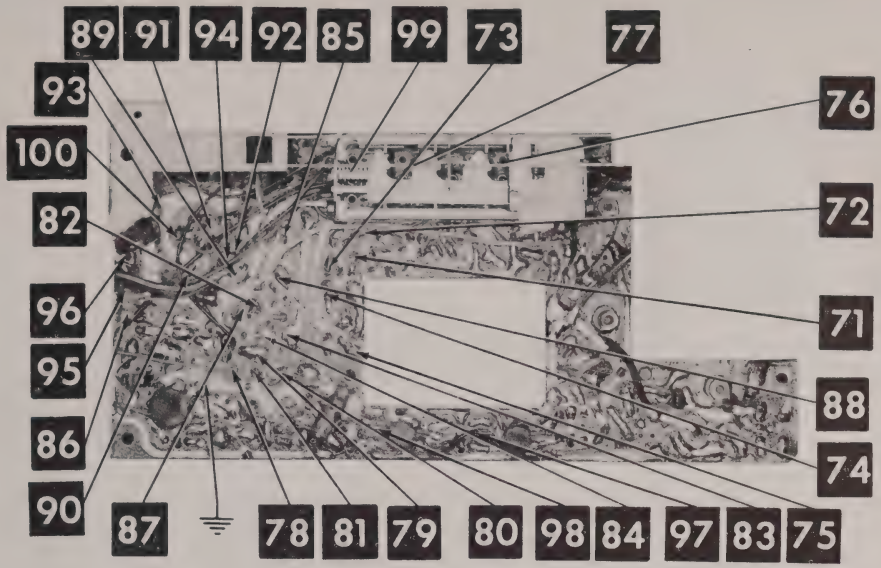
HITACHI
MODEL XH-1500



CHASSIS TOP VIEW-CAPACITOR IDENT.



CHASSIS TOP VIEW-RESISTOR IDENT.



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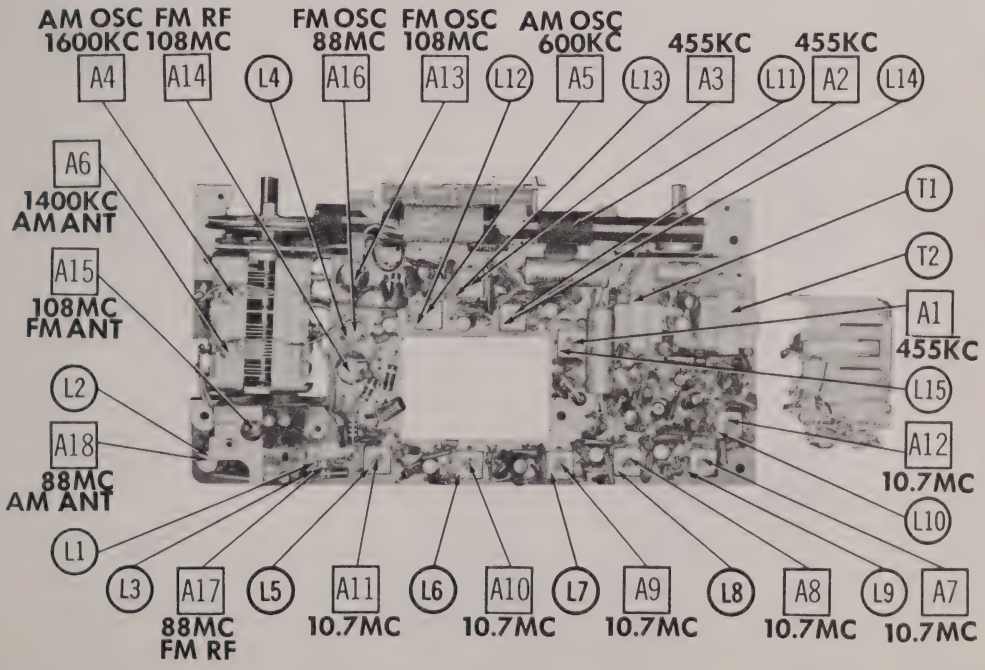


CHASSIS TOP VIEW-ALIGNMENT & INDUCTOR IDENT.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1 thru A12.....GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2522, 2523, 2531, 2532, 2534, 2537, 2538
A13, A14, A15... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528
A16, A17, A18.... GENERAL CEMENT #8282, 8606, 8606-L, 9091
WALSCO #2526, 2541, 2542, 2543, 2544

AM ALIGNMENT — SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400% Mod.)	(AM) Tuning gang fully open.	Across Voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1600KC	1600KC	"	A4	"
3.	"	600KC	600KC	"	A5	"
4.	"	1400KC	1400KC Signal.	"	A6	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM — SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .1mfd to base of FM Mixer. Low side to chassis.	10.7MC	(FM) Point of non-interference.	DC probe thru 1meg to point (A) Common to chassis.	A7, A8, A9, A10, A11	Adjust for maximum deflection.
6.	"	"	"	DC probe to point (B). Common to point (C).	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE — SELECTOR IN FM POSITION

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .1mfd to base of FM Mixer. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. thru 47K to point (A). Low side to chassis.	A7, A8, A9, A10, A11	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
6.	"	"	"	Vert. amp. to point (B). Low side to chassis.	A12	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT — SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7.	Across external FM antenna terminals.	108MC (Unmod.)	(FM) 108MC	DC probe thru 1meg to point (A). Common to chassis.	A13, A14, A15	Adjust for maximum deflection.
8.	"	88MC	88MC	"	A16, A17, A18	"

FIG. 1

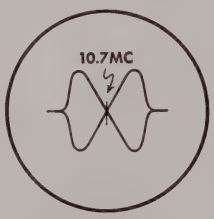


FIG. 2

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2SA87	FM RF Amplifier				PNP
X2	2N384	FM Mixer				PNP
X3	2SA88	FM Osc.				PNP
X4	2SA80	1st FM IF Amplifier				PNP
X5	2SA80	2nd FM IF Amplifier				PNP
X6	2SA80	3rd FM IF Amplifier				PNP
X7	2SA80	4th FM IF Amplifier				PNP
X8	2SB75	FM AF Amplifier	2N406			PNP
X9	2SA15	AM Converter				PNP
X10	2SA12	1st AM IF Amplifier	2N410			PNP
X11	2SA12	2nd AM IF Amplifier	2N410			PNP
X12	2SB75	AF Amplifier	2N406			PNP
X13	2SB75	Driver	2N406			PNP
X14	2SB77	Output	2N408			PNP
X15	2SB77	Output	2N408			PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	HITACHI PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	3	6		PTT-6003	NLW3-25	TT6X3	MLV5-6	TE-1082	
C2	5	10		PTT-10005	NLW5-15	TT12X5	MLV5-12	TE-1127	
C3	10	10		PTT-10010	NLW10-15	TT12X10	MLV10-10	TE-1114	
C4	3	6		PTT-6003	NLW3-25	TT6X3	MLV5-6	TE-1082	
C5	3	6		PTT-6003	NLW3-25	TT6X3	MLV5-6	TE-1082	
C6	3	6		PTT-6003	NLW3-25	TT6X3	MLV5-6	TE-1082	
C7	10	10		PTT-10010	NLW10-15	TT12X10	MLV10-10	TE-1114	
C8	3	6		PTT-6003	NLW3-25	TT6X3	MLV5-6	TE-1082	
C9	50	10		PTT-10050	NLW50-10	TT10X50	MLV50-10	TE-1119	
C10	100	10		PTT-10100	NLW100-12	TT15X100	MLV100-10	TE-1119, 3	
C11	100	10		PTT-10100	NLW100-12	TT15X100	MLV100-10	TE-1119, 3	
C12	25	10		PTT-10025	NLW25-10	TT10X25	MLV25-10	TE-1118	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C13	7	Note 1		829-7				
C14	10		SI 10	D6-100	L10Q1	CCD-100	GP410	10TS-Q10
C15	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C16	40000			DD-403	BYB6S4		GP140	

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C17	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C18	7	Note 1		829-7				
C19	10		SI 10	D6-100	L10Q1	CCD-100	GP410	10TS-Q10
C20	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C21	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C22	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C23	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C24	3		NPO-SI 3.0	TCZ-3R3	C10V3C	CCTO-3R3	CNO-533	10TCC-V33
C25	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C26	2		NPO-SI 2.0	TCZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22
C27	7	Note 1		829-7				
C28	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C29	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C30	2		NPO-SI 2.0	TCZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22
C31A	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
B	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C32	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C33	2		NPO-SI 2.0	TCZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22
C34A	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
B	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C35	40000			DD-403	BYB6S4		GP140	
C36A	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
B	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C37	2		NPO-SI 2.0	TCZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22
C38	40000			DD-403	BYB6S4		GP140	
C39A	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
B	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C40	40000			DD-403	BYB6S4		B-140	
C41	100		SI 100	D6-101	L10T1	CCD-101	GP310	10TS-T10
C42	100		SI 100	D6-101	L10T1	CCD-101	GP310	10TS-T10
C43	8		NPO-SI 8.2		C10V8C			10TCC-V82
C44	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C45	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C46	5		NPO-SI 5.0	TCZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C47	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C48	40000			DD-403	BYB6S4		GP140	
C49	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C50A	40000			DD-403	BYB6S4		GP140	
B	40000			DD-403	BYB6S4		GP140	
C51	4				C10V4C			
C52A	40000			DD-403	BYB6S4		GP140	
B	40000			DD-403	BYB6S4		GP140	
C53	4				C10V4C			
C54	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C55	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C56	40000			DD-403	BYB6S4		GP140	
C57	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C58	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C59	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10

PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C60	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5MK-D50
C61	20000		BPD-02	DD-203	BYB682	CCD-203	B-120	5HK-S20

Note 1. Nominal Value.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	HITACHI PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4						Volume

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	5600Ω				R34	56K			
R3	22K				R35	47K			
R4	1000Ω				R36	4700Ω			
R5	470Ω				R37	4700Ω			
R6	4700Ω				R38	10K			
R7	33K				R39	33K			
R8	1000Ω				R40	10K			
R9	470Ω				R41	3300Ω			
R10	1.0Ω				R42	470Ω			
R11	470Ω				R43	150K			
R12	33K				R44	1000Ω			
R13	5600Ω				R45	1500Ω			
R14	1500Ω				R46	47K			
R15	470Ω				R47	5600Ω			
R16	33K				R48	1000Ω			
R17	5600Ω				R49	4700Ω			
R18	1500Ω				R50	10K			
R19	470Ω				R51	56K			
R20	100Ω				R52	10K			
R21	33K				R53	390Ω			
R22	5600Ω				R54	1000Ω			
R23	1500Ω				R55	3300Ω			
R24	1000Ω				R56	56K			
R25	470Ω				R57	33K			
R26	33K				R58	4700Ω			
R27	5600Ω				R59	680Ω			
R28	1500Ω				R60	22Ω			
R29	1000Ω				R61	56Ω			
R30	470Ω				R62	8.2Ω			
R31	56K				R63	5.6Ω			
R32	56K				R64	1.5Ω			
R33	100K				R65	33Ω			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		HITACHI PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	RF Choke						
L2	FM Ant.						
L3	FM RF						
L4	FM Osc.						
L5	1st FM IF						
L6	2nd FM IF						
L7	3rd FM IF						
L8	4th FM IF						
L9	Discriminator Pri						
L10	Discriminator Sec						
L11	Loopstick						

COILS (RF-IF) (cont)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		HITACHI PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L12	AM Osc.						
L13	1st AM IF						
L14	2nd AM IF						
L15	3rd AM IF						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	HITACHI PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.2	1	CT-63		TA-30			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	HITACHI PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1500Ω CT	10-12Ω	OT-74					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	HITACHI PART No.	QUAM PART No.	
SP1	3"x 7"	PM	10-12Ω	SE-1602		

BATTERIES

ITEM No.	VOLTAGE	HITACHI PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V	UM-2 *		130 *		635 *		M-14 *	* 6 Required

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		HITACHI PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N60			1N60	1N60	FM Limiter
M3	1N60			1N60	1N60	Discriminator
M4	1N60			1N60	1N60	
M5	1N34A			1N34A	1N34A	AM AVC
M6	1N34A			1N34A	1N34A	AM Detector
M7	HV15					Output Bias

MISCELLANEOUS

ITEM No.	PART NAME	HITACHI PART No.	NOTES
M8	Tuning Gang		FM, 3 Gang
M9	Tuning Gang		AM, 2 Gang
M10	Switch		Pushbutton Type, Includes Off, FM, AM, & Tone

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

PHOTOFACT® Folder with CIRCUITRACE®

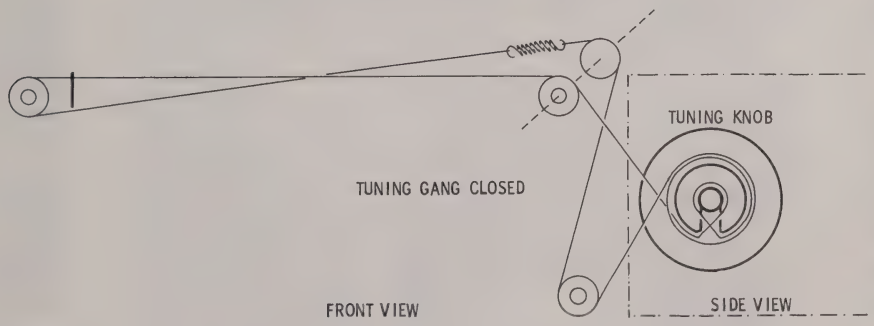
MATSUSHITA
MODEL T-30

MATSUSHITA
MODEL T-30

MATSUSHITA
MODEL T-30

TRADE NAME	Matsushita Model T-30		
IMPORTER	Matsushita Electric Corp. of America, 41 E. 42nd Street, New York 17, N. Y.		
TYPE SET	Battery Operated Transistorized Portable FM-AM Receiver		
POWER SUPPLY	6 Volts DC	RATING	12MA @ 6 Volts DC (No Signal, Min. Volume) AM 25MA @ 6 Volts DC (Signal, Normal Volume) AM 17MA @ 6 Volts DC (No Signal, Min. Volume) FM 30MA @ 6 Volts DC (Signal, Normal Volume) FM
TUNING RANGE—BROADCAST	535 — 1605KC	FREQ. MOD.	88 — 108MC

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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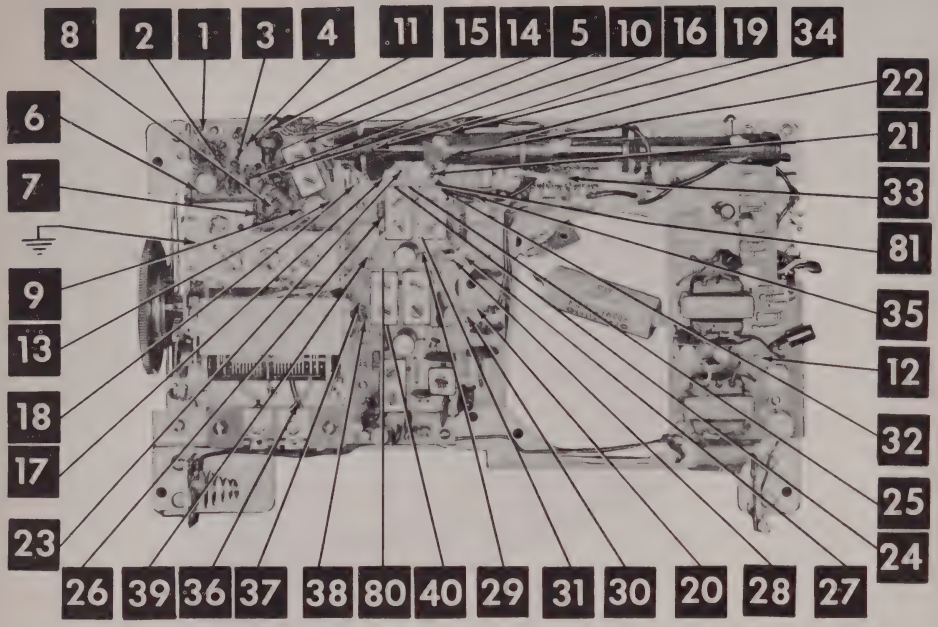
KF576

SET 541 FOLDER 12



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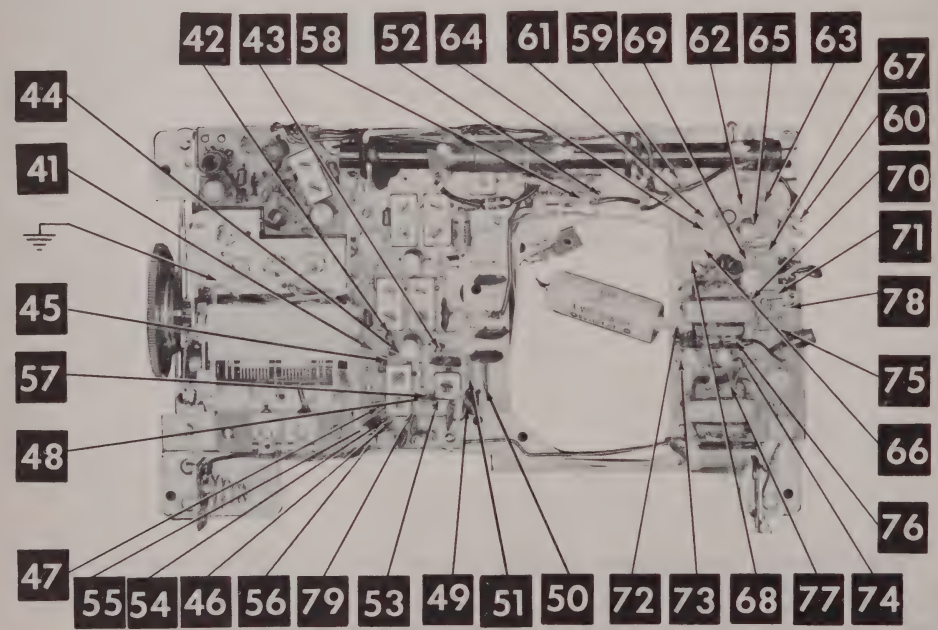
PRINTED BOARD



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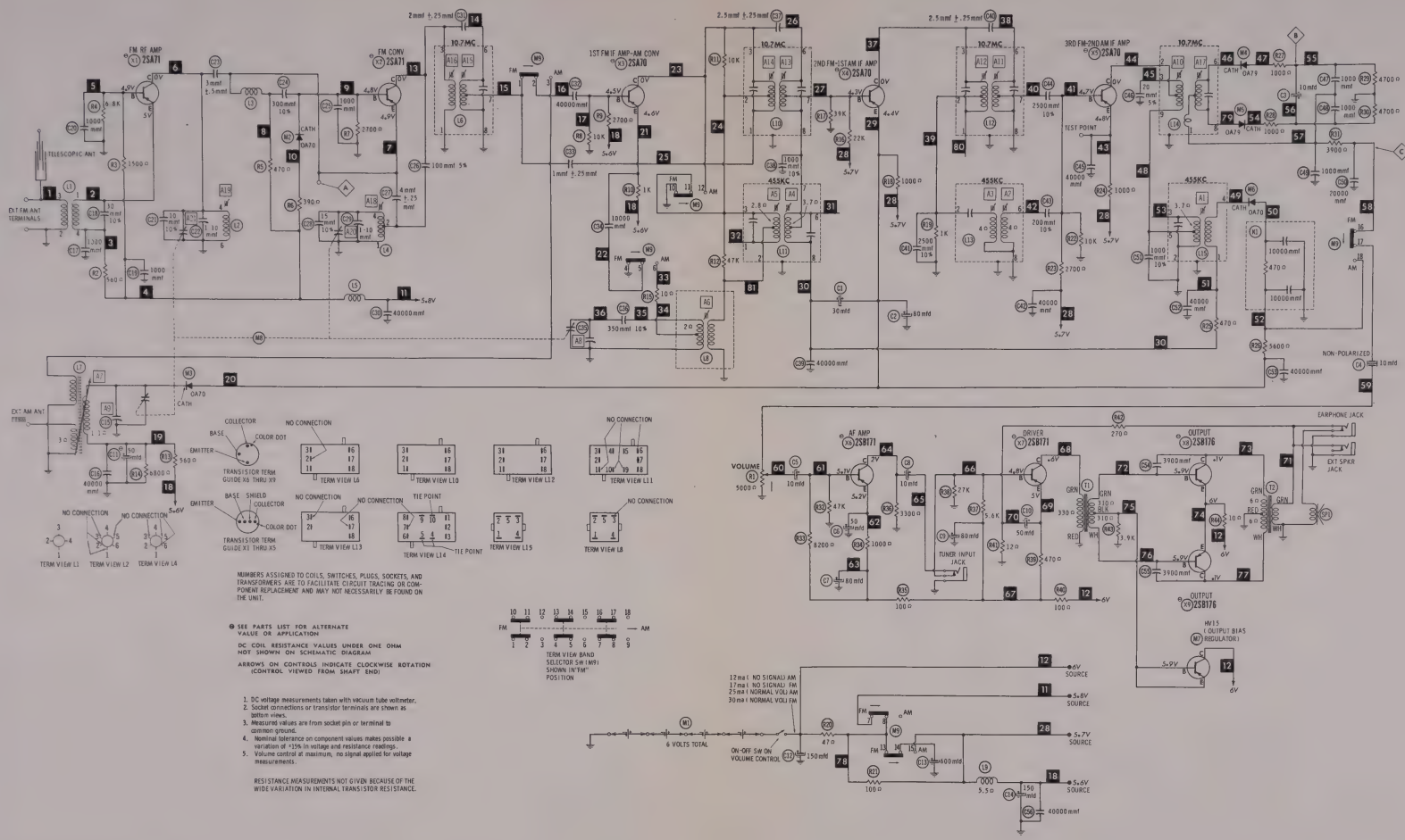

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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MATSUSHITA MODEL T-30

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1 thru A6, A10 thru A17. . . GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538
A8, A9. . . . . GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A18 thru A21. . . . . GENERAL CEMENT #8721, 8722
WALSCO #2519

AM ALIGNMENT — SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .01mfd to AM antenna stator lug of tuning gang. Low side to chassis.	455KC (400% Mod.)	(AM) Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4, A5	Adjust for maximum output.
2.	Loop	600KC	600KC	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	1500KC	1500KC	"	A8, A9	Adjust for maximum output. Repeat Steps 2 and 3.

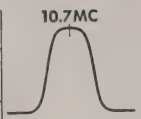


FIG. 1

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM — SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	High side thru .001mfd to point Ⓐ. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe to point Ⓑ. Common to chassis.	A10, A11, A12, A13, A14, A15, A16	Adjust for maximum deflection.
5.	"	"	"	DC probe to point Ⓒ. Common to chassis.	A17	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

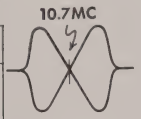


FIG. 2

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE — SELECTOR IN FM POSITION

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	High side thru .001mfd to point Ⓐ. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. to point Ⓑ. Low side to chassis.	A10, A11, A12, A13, A14, A15, A16	Disconnect stabilizing capacitor C3. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C3.
5.	"	"	"	Vert. Amp. to poing Ⓒ. Low side to chassis.	A17	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A10 for maximum amplitude and straightness of cross-over lines.

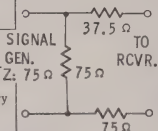
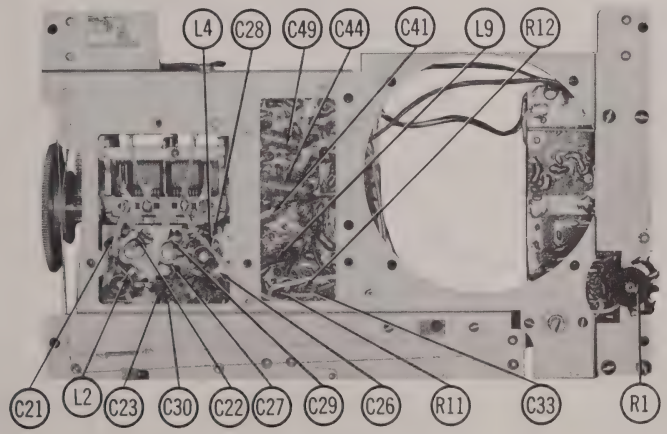


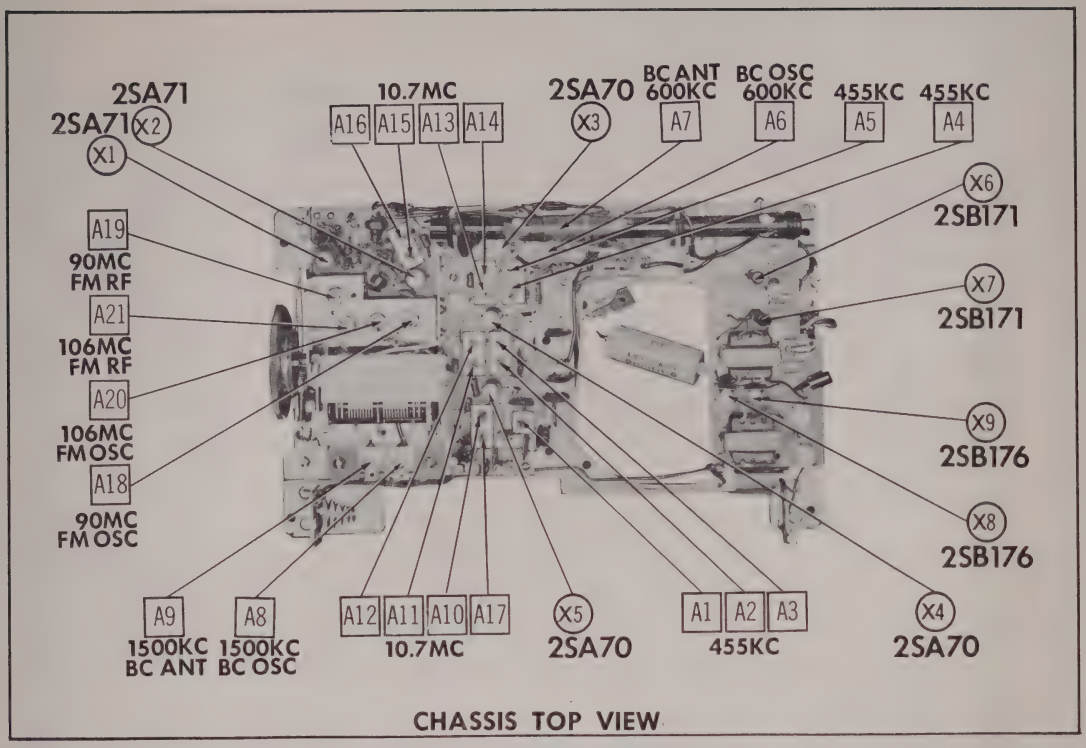
FIG. 3

FM RF ALIGNMENT — SELECTOR IN FM POSITION

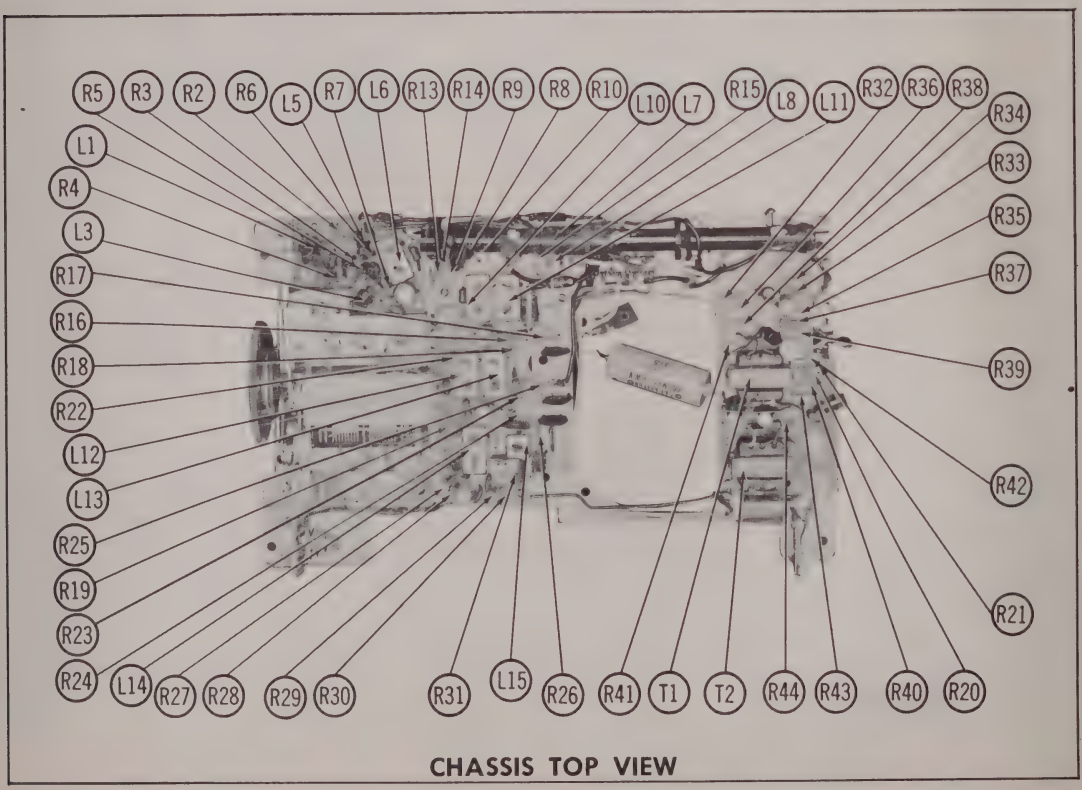
	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	Across FM antenna terminals thru matching network (Fig. 3).	90MC (Unmod.)	(FM) 90MC	DC probe to point Ⓑ Common to chassis.	A18, A19	Adjust for maximum deflection.
7.	"	106MC	106MC	"	A20, A21	"



CHASSIS BOTTOM VIEW



CHASSIS TOP VIEW



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2SA71	FM RF Amplifier				PNP
	OC171 ①	FM RF Amplifier				PNP
X2	2SA71	FM Converter				PNP
	OC171 ①	FM Converter				PNP
X3	2SA70	1st FM IF Amp. -AM Conv.				PNP
	OC170 ①	1st FM IF Amp. -AM Conv.				PNP
X4	2SA70	2nd FM-1st AM IF Amp.				PNP
	OC170 ①	2nd FM-1st AM IF Amp.				PNP
X5	2SA70	3rd FM-2nd AM IF Amp.				PNP
	OC170 ①	3rd FM-2nd AM IF Amp.				PNP
X6	2SB171	AF Amplifier				PNP
	OC71 ①	AF Amplifier	2N406	2N362	2N406	PNP
X7	2SB171	Driver				PNP
	OC71 ①	Driver	2N406	2N362	2N406	PNP
X8	2SB176	Output				PNP
	OC76 ①	Output				PNP
X9	2SB176	Output				PNP
	OC76 ①	Output				PNP

① Alternate.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Matsushita PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	30	3	NPA-3V30	BCD3035	ECPB412	PET130	MLV30-6	VL-1043	
C2	80	6	NPA-6V80L	BCD10080	ECPB116	PET1400	MLV100-6	VL-1097	
C3	10	10	NPA-10V10	BCD10010	ECPB408	PET1340	MLV10-10	VL-1127	
C4	10	6NP	NPA-6V10LNP	PRS7315	BBR10-150	TCN5010		TVANS-1204.1*	
C5	10	6	NPA-6V10L	BCD6010	ECPB408	PET1340	MLV10-6	VL-1087	
C6	50	6	NPA-6V50L	BCD6050	ECPB115	PET1575	MLV50-6	VL-1094	
C7	80	6	NPA-6V80L	BCD10080	ECPB116	PET1400	MLV100-6	VL-1097	
C8	10	6	NPA-6V10L	BCD6010	ECPB408	PET1340	MLV10-6	VL-1087	
C9	80	6	NPA-6V80L	BCD10080	ECPB116	PET1400	MLV100-6	VL-1097	
C10	50	6	NPA-6V50L	BCD6050	ECPB115	PET1575	MLV50-6	VL-1094	
C11	50	6		BCD6050	ECPB115	PET1575	MLV50-6	VL-1094	①
C12	150	6	NPA-6V150H	BCD6150	ECPB119	PET1400	MLV150-6	VL-1104	
C13	600	6	CT-6V600	PRS1120	BR500-6	TC605	TD-500-6	TVA-1103	
C14	150	6	NPA-6V150H	BCD6150	ECPB119	PET1400	MLV150-6	VL-1104	

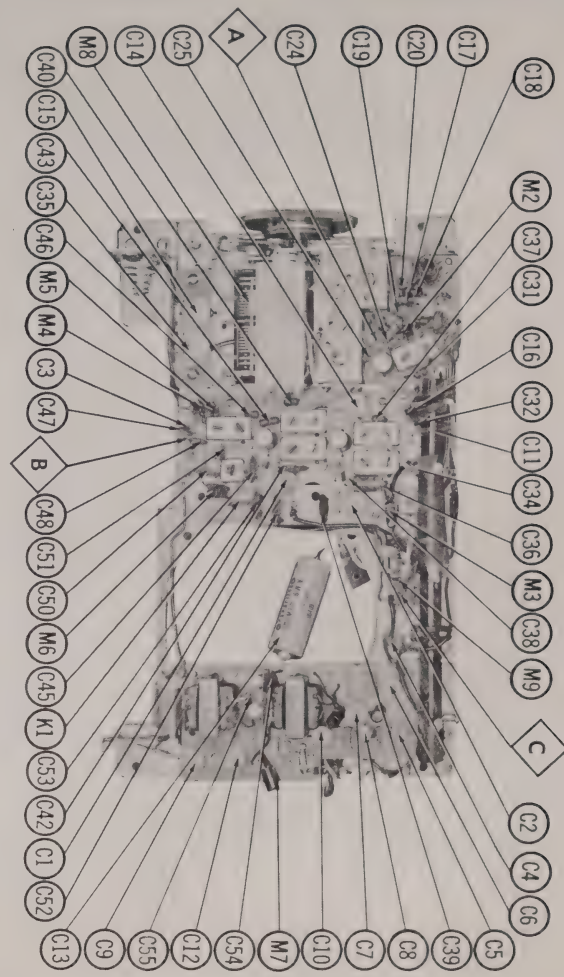
① Some versions may use 10mfd@6V in this application (Part #NPA-6V10L).
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C15		#2212A						
C16	40000			DD-403	BYB6S4		GP140	
C17	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C18	30 10%		NPO-SI 30	TCZ-30	C10Q3C	CCTO-300	CNO-433	10TCC-Q30
C19	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C20	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C21	10 10%		NPO-SI 10	TCZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C22	1-10	#PP-1A10D						
C23	3 ± .5mmf		NPO-SI 3.0	TCZ-3R3	C10V3C	CCTO-3R3	CNO-533	10TCC-V33
C24	300 10%			D6-301	L10T3	CCD-301	GP330	10TS-T30
C25	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C26	100 5%			TCZ-100	C10T1C	CCTO-101	CNO-310	10TCC-T10
C27	4 ± .25mmf				C10V4C			10TCC-V39
C28	15 10%		NPO-SI 15	TCZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C29	1-10	#PP-1A10D						
C30	40000			DD-403	BYB6S4		GP140	
C31	2 ± .25mmf		NPO-SI 2.0	TCZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22
C32	40000			DD-403	BYB6S2		GP140	
C33	1 ± .25mmf		NPO-DI 1.0	TCZ-1			CNO-510	10TCC-V10
C34	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C35		#2212A						
C36	350 10%			D6-351	L10T35	CCD-351	GP335	10TS-T35
C37	2.5 ± .25mmf		NPO-SI 3.0	TCZ-2R2	C10V3C	CCTO-2R2	CNO-522	10TC-V27

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C38	1000 10%			DD-102	5R5D1	CCD-102	GP210	10TS-D10
C39	40000			DD-403	BYB6S4		GP140	
C40	2.5 + .25mmf			NPO-SI 3.0 TCZ-2R2	C10V3C	CCTO-2R2	CNO-522	10TCC-V27
C41	2500 10%				1R5D25	CCD-252		10TS-D25
C42	40000			DD-403	BYB6S4		GP140	
C43	200 10%			NPO-SI 210 D6-201	L10T2	CCD-201	GP320	10TS-T20
C44	2500 10%				1R5D25	CCD-252		10TS-D25
C45	40000			DD-403	BYB6S4		GP140	
C46	20 5%			TCZ-20	C10Q2C	CCTO-200	CNO-422	10TCC-Q20
C47	1000			BPD-001 DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C48	1000			BPD-001 DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C49	1000			BPD-001 DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C50	20000			BPD-02 DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C51	1000 10%			DI-1000 DD-102	5R5D1	CCD-102	GP210	10TS-D10
C52	40000			DD-403	BYB6S4		GP140	
C53	40000			DD-403	BYB6S4		GP140	
C54	3900			DI-4000 DD-392	L10D39	CCD-392	GP239	10TS-D39
C55	3900			DI-4000 DD-392	L10D39	CCD-392	GP239	10TS-D39
C56	40000			DD-403	BYB6S4		GP-140	

Matsushita Part Number.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Matsushita PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/10	SNVa-16					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less; unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No	REMARKS
R2	560Ω				R24	1000Ω			
R3	1500Ω				R25	470Ω			
R4	6800Ω				R26	5600Ω			
R5	470Ω				R27	1000Ω			
R6	390Ω				R28	1000Ω			
R7	2700Ω				R29	4700Ω			
R8	10K				R30	4700Ω			
R9	2700Ω				R31	3900Ω			
R10	1000Ω				R32	47K			
R11	10K				R33	8200Ω			
R12	47K				R34	1000Ω			
R13	560Ω				R35	100Ω			
R14	6800Ω				R36	3300Ω			
R15	10Ω				R37	5600Ω			
R16	22K				R38	27K			
R17	39K				R39	470Ω			
R18	1000Ω				R40	100Ω			
R19	1000Ω				R41	12Ω			
R20	47Ω				R42	270Ω			
R21	100Ω				R43	3900Ω			
R22	10K				R44	10Ω			
R23	2700Ω								

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Matsushita PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	FM Ant.	MA07-C					
L2	FM RF	MD07-D					
L3	RF Choke	SFCF-0808					
L4	FM Osc.	MO07-D					
L5	RF Choke	VQ-125-00					
L6	1st FM IF	TFI-10D-1A					
L7	Loopstick	AM106-E					
L8	AM Osc.	TRL-M013					
L9	RF Choke	VQ-125-00					

COILS (RF-IF) (cont)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Matsushita PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L10	2nd FM IF	TFI-10D-1B					
L11	1st AM IF	TRI-10D-1A					
L12	3rd FM IF	TFI-10D-1C					
L13	2nd AM IF	TRI-10D-1B					
L14	Ratio Detector	TFI-10D-1D					
L15	3rd AM IF	TRI-10D-1D					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	Matsushita PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	.9	1	T1P-20A					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	Matsushita PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	200Ω CT	6-8Ω	TT-501					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Matsushita PART No.	QUAM PART No.	
SP1	3½"	PM	6-8Ω	P-328S	3A07Z8	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Matsushita PART No.	REPLACEMENT DATA
K1	AM Diode Filter	(2) 10000mmf, 470Ω	CR31PM471	

BATTERIES

ITEM No.	VOLTAGE	Matsushita PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V	UM-2 *		230 *		A-100*		M-13R*	* 4 Required

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Matsushita PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	OA70			1N60	1N60	FM AFC
M3	OA70			1N60	1N60	AM AVC
M4	OA79			1N295	1N295	Ratio Det.
M5	OA79			1N295	1N295	
M6	OA70			1N60	1N60	AM Det.
M7	HV15					Output Bias Regulator

MISCELLANEOUS

ITEM No.	PART NAME	Matsushita PART No.	NOTES
M8	Tuning Cap.	2YC-31	4 Gang
M9	Switch	RS . SW-C	Band Selector

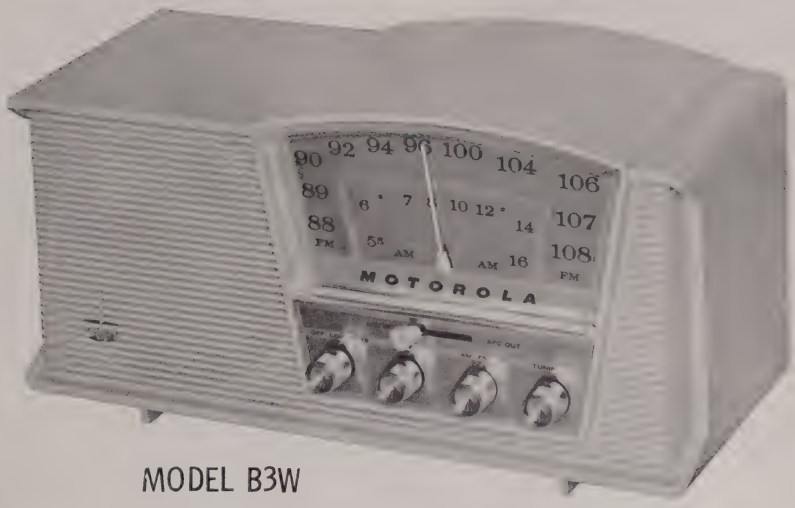
WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

PHOTOFACT® Folder with CIRCUITRACE®

MOTOROLA
MODELS B3E, B3W (Ch. HS-821)

MOTOROLA
MODELS B3E, B3W (Ch. HS-821)



MODEL B3W

MOTOROLA
MODELS B3E, B3W (Ch. HS-821)

TRADE NAME	Motorola Models B3E, B3W (Ch. HS-821		
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois		
TYPE SET	AC-DC Operated 9 Tube FM-AM Receiver		
POWER SUPPLY	110 — 120 Volts AC-DC	RATING	54 Watts, .53 Amp. @117 Volts AC
TUNING RANGE—BROADCAST	535 — 1620KC	FREQ. MOD.	88 — 108MC

DISASSEMBLY

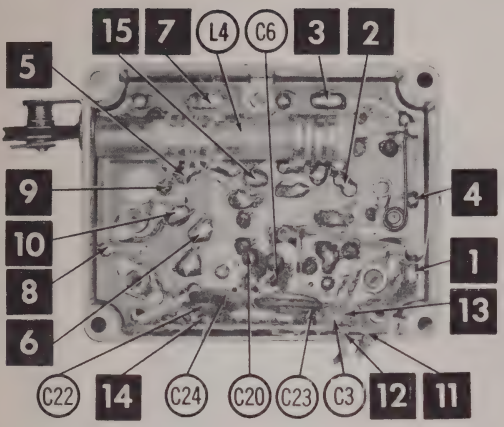
1. Remove control knobs by pulling off.
2. Remove 4 screws holding back cover. Remove cover.
3. Remove 2 screws holding chassis support bracket.
4. Remove screw holding AM gang bracket to cabinet.
5. Remove dial crystal by inserting screwdriver behind top edge of crystal and releasing catch. Pry out crystal.
6. Remove dial pointer by pulling off.
7. Remove 2 palnuts from front of chassis.
8. Unsolder speaker leads and lead of bottom shield.
9. Remove chassis.

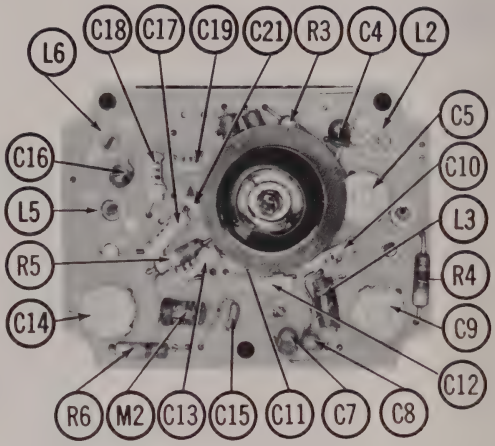
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

KK640

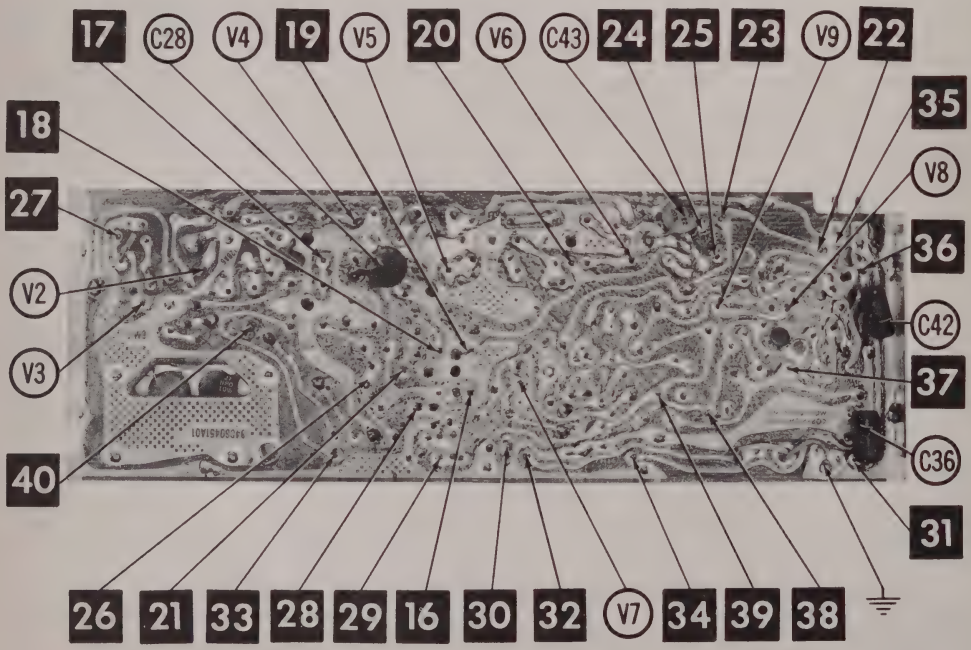
SET 541 FOLDER 13





A Howard W. Sams CIRCUITRACE® Photo

FM RF SUBCHASSIS



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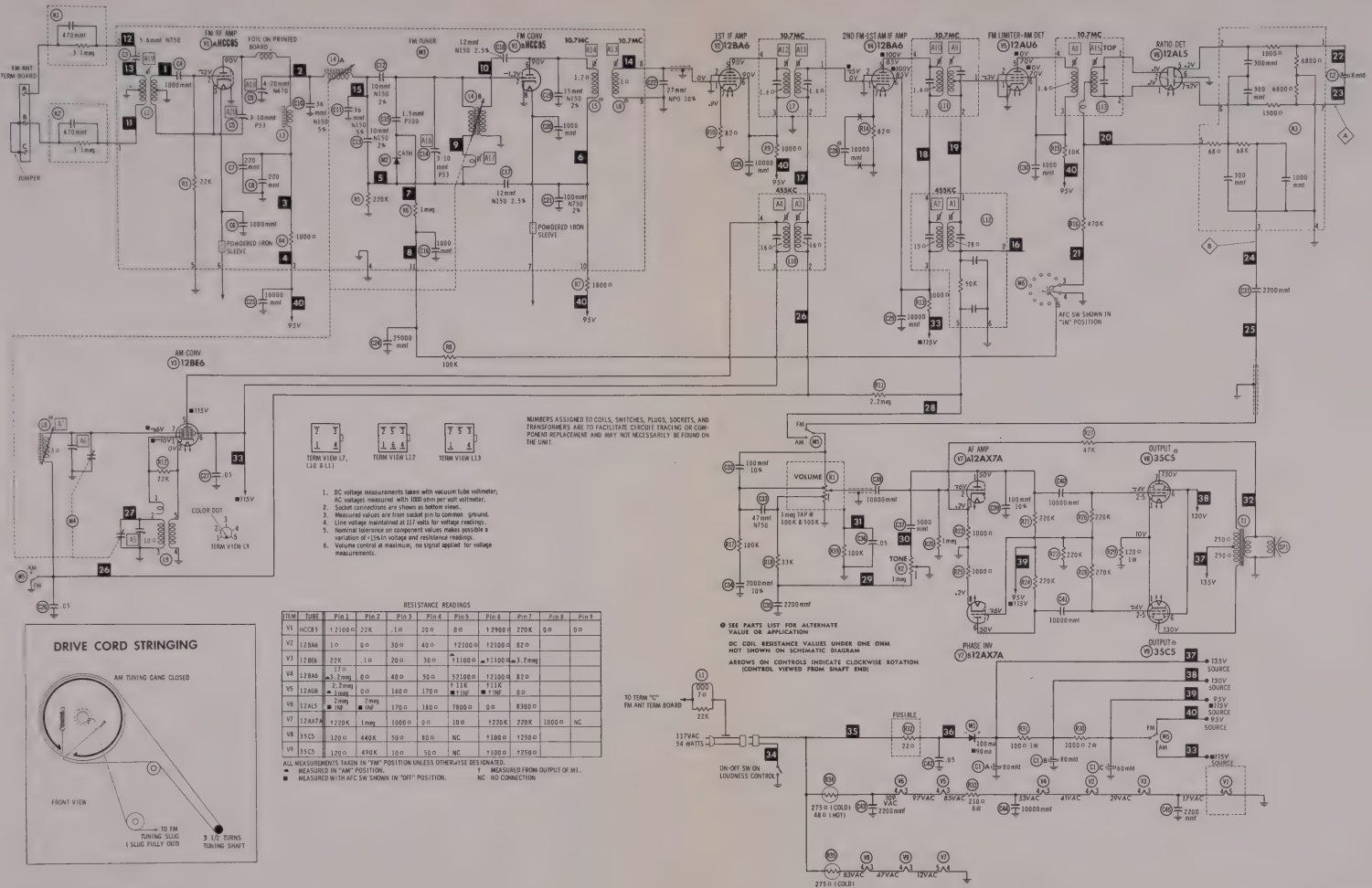
PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CC85	↑2100Ω	22K	.1Ω	20Ω	0Ω	↑2900Ω	220K	0Ω	0Ω
V2	12BA6	1Ω	0Ω	30Ω	40Ω	↑2100Ω	↑2100Ω	82Ω		
V3	12BE6	22K	.1Ω	20Ω	30Ω	▲11000Ω ■↑1100Ω	▲3.2meg			
V4	12BA6	17Ω ▲3.2meg	0Ω	40Ω	50Ω	52100Ω	↑2100Ω	82Ω		
V5	12AU6	2.2meg ▲ 1meg ■ INF	0Ω	160Ω	170Ω	↑11K ■↑INF	↑11K ■↑INF	0Ω		
V6	12AL5	1meg ■ INF	2meg ■ INF	170Ω	180Ω	78000Ω	0Ω	83000Ω		
V7	12AX7A	↑220K	1meg	1000Ω	0Ω	10Ω	↑220K	220K	1000Ω	NC
V8	35C5	120Ω	440K	50Ω	80Ω	NC	↑100Ω	↑250Ω		
V9	35C5	120Ω	690K	10Ω	50Ω	NC	↑100Ω	↑250Ω		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
▲ MEASURED IN "AM" POSITION.
■ MEASURED WITH AFC SW SHOWN IN "OFF" POSITION.
↑ MEASURED FROM OUTPUT OF M1.
NC NO CONNECTION

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

DRIVE CORD STRINGING

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE
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MOTOROLA
MODELS B3E, B3W (Ch. HS-821)

CHASSIS TOP VIEW-CAPACITOR & RESISTOR IDENT.

MOTOROLA
MODELS B5E, B5W (CHS-821)

FOLDER 13

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.

Suggested Alignment Tools:

A1 thru A4, A8 thru A12, A15	GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440 WALSCO #2526, 2543, 2544, 2545
A5, A6	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A13, A14, A17, A19	GENERAL CEMENT #9440
A16, A18, A20	GENERAL CEMENT #8607, 9291, 9294 WALSCO #2520, 2522, 2523, 2524, 2534, 2537, 2538

AM ALIGNMENT — SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400∿ 30% AM)	(AM) Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	Loop	1620KC	"	"	A5	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
3.	"	1400KC	1400KC	"	A6	"
4.	"	600KC	600KC	"	A7	Adjust by changing spacing of windings on Loopstick core.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM — SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	Across FM antenna terminals.	10.7MC (Unmod.)	(FM) High end stop.	DC probe to point Ⓐ. Common to chassis.	A8, A9, A10, A11, A12, A13, A14	Adjust for maximum deflection.
6.	"	"	"	DC probe to point Ⓑ. Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE — SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	Across FM antenna terminals.	10.7MC (450KC Swp.)	(FM) High end stop.	Vert. amp. to point Ⓐ. Low side to chassis.	A8, A9, A10, A11, A12, A13, A14	Disconnect stabilizing capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C2.
6.	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A15	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT — SELECTOR IN FM POSITION

AFC "Out". If set oscillates, perform step 11 before and after RF Alignment.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7.	Across FM antenna terminals.	108.5MC (Unmod.)	(FM) High end stop.	DC probe to point Ⓐ. Common to chassis.	A16	Adjust for maximum deflection.
8.	"	87.5MC	Low end stop.	"	A17	Adjust for maximum deflection. Repeat Steps 7 and 8.
9.	"	94MC	94MC Signal.	"	A18	Adjust for maximum deflection.
10	"	90MC	90MC Signal.	"	A19	Adjust for maximum deflection. Repeat steps 9 and 10.

11 Disconnect generator and connect a 300Ω ½ Watt carbon resistor across FM antenna terminals and tune across the FM band. Observe the VTVM for oscillation as indicated by any reading other than zero. If oscillation occur at any point along the dial, back A19 out of the coil form as far as possible, then adjust A20 until oscillation ceases. Repeat Step 10.

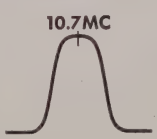


FIG. 1

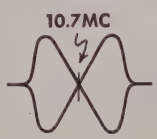


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	FM RF Amp. -FM Conv.	HCC85	V6	Ratio Detector	12AL5
V2	1st FM IF Amplifier	12BA6	V7	AF Amp. -Phase Inv.	12AX7A
V3	AM Converter	12BE6	V8	Output	35C5 ①
V4	2nd FM-1st AM IF Amp.	12BA6	V9	Output	35C5 ①
V5	FM Limiter-AM Det.	12AU6			

① Some versions may use 50C5 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	80	150	23B60423A01	PWH3-13-70				PCLS-3445.5*	
B	80	150							
C	60	150							
C2	8	50	23K647219	PTT-91	NLW8-100	TT150X8	TD-8-150	TE-1303.3	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

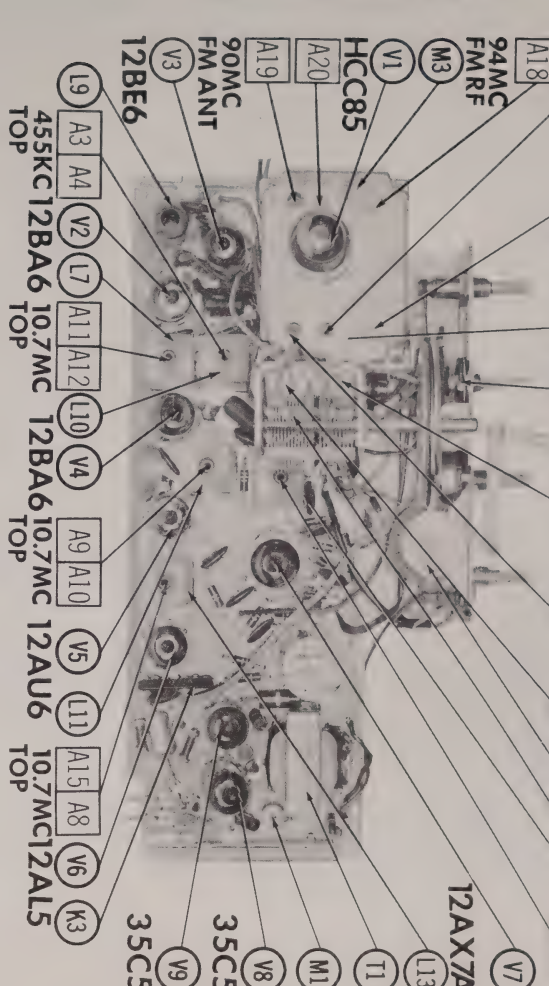
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	5.6 N750	#21K647194						
C4	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C5	3-10 P33	#20K646183						
C6	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C7	220		DI-220	DD-221	L10T22	CCD-221	B-322	10TS-T22
C8	220		DI-220	DD-221	L10T22	CCD-221	B-322	10TS-T22
C9	4-20 N470	#20K646185						
C10	36 N150 5%	#21K646186				*		
C11	36 N150 5%	#21K646186				*		
C12	10 N150 2%	#21K646187				*		
C13	10 N150 2%	#21K646187				*		
C14	3-10 P33	#20K646183						
C15	1.5 P100	#21K646188						
C16	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C17	12 N150 2.5%	#21K646189				*		
C18	12 N150 2.5%	#21K646189				*		
C19	15 N150 2%	#21K646190				*		
C20	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C21	100 N750 2%	#21K646191		TCN-100				
C22	27 NPO 10%		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C23	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C24	25000					IDP-1-253	GEM-4125	5HK-S25
C25	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C26	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C27	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C28	10000	Note 1	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C29	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C30	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C31	2200		BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C32	100 10%		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C33	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C34	2000 10%		DI-2000		5R5D2	CCD-202	GP220	10TS-D20
C35	2200		BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C36	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C37	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C38	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C39	100 10%		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C40	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C41	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C42	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-4147	4TM-S50
C43	2200		BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C44	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C45	2200		BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22

* Not normally in distributor's stock. Available thru distributor on order to manufacturer. # Motorola Part Number.
Note 1. Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg *	½	18B60461A01	BT-165				Loudness
B	Switch			KR-1				Power Off-On
R2A	1meg		18A60200A01	B-69	A47-1meg-S	Q11-137	U54	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

* Taps @ 100K & 500K.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R3	22K				R20	1meg			
R4	1000Ω				R21	220K			
R5	220K				R22	1000Ω			
R6	1meg				R23	220K			
R7	1800Ω				R24	220K			
R8	100K				R25	1000Ω			
R9	1000Ω				R26	220K			
R10	82Ω				R27	47K			
R11	2.2meg				R28	270K			
R12	22K				R29	120Ω 1W			
R13	1000Ω				R30	1000Ω 2W			
R14	82Ω				R31	100Ω 1W			
R15	10K				R32	22Ω			
R16	470K				R33	210Ω 6W	PW6-210	7W-SQ-210	
R17	100K				R34	275Ω Cold*			Pt. #6B643916
R18	33K				R35	275Ω Cold*			Pt. #6B643916
R19	100K								

* Hot Resistance, 48Ω.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA	
K1	Antenna Filter	470mmf, .3-1meg	51K754068	Centralab	RC-471
				Sprague	AC1-1
K2	Antenna Filter	470mmf, .3-1meg	51K754068	Centralab	RC-471
				Sprague	AC1-1
K3	Ratio Detector Network	(3) 300mmf, 1000mmf, 68Ω, 1000Ω, 1500Ω, (2) 6800Ω, 68K	51K647082	Aerovox	PA-694
				Centralab	PC-342
				Sprague	C-12

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		MOTOROLA PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	RF Choke	24C60599A01 ①					① Includes 22K
L2	FM Ant.	24K646196					
L3	RF Choke	24K646193					
L4A	FM RF	24K646194					
B	FM Osc.						
L5	1st FM IF Pri	24K646197 ②					② Part #1K646537 for L5 & L6
L6	1st FM IF Sec.	1K646198 ②					
L7	2nd FM IF	24K647049	FM-256	1463-PC	RTC-9046	T654	③ Part #24D60252A02 used in Model B3E
L8	Loop Ant.	24D60252A01 ③					
L9	AM Osc.	24K647159					
L10	1st AM IF	24K647022	BC-356	13-PC1	RTC-8641	T614	
L11	3rd FM IF	24K647161					
L12	2nd AM IF	24K647021					
L13	Ratio Detector	24C647050	FM-257	1465-PC	RTC-9053	T659	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	MOTOROLA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	5800Ω CT	3-4Ω	25C60424A01	A-2900 ①	A-3856 ①	24S04 ①	S-52X ①	① Drill new mounting hole(s).

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	6"	PM	3-4Ω	50K647025	6A15	

POWER RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	MOTOROLA PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.100A	48K752497	1N1763	40H	SR500	Silicon

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		MOTOROLA PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2		48K646192				AFC (Part of FM Tuner)

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	FM Tuner	77K647193	Complete, Less Tube
M4	Tuning Cap.	19B60154A02	AM, 2 Gang
M5	Switch	40B60020A01	Function Selector (Rotary Type)
M6	Switch	40C60205A01	AFC (Lever Type)
	Printed Board	1V60037A52	Less all components, includes AC interlock and board Part #84C60451A01

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Scale	34C60194A01	
Dial Pointer	1V60030A51	
Dial Crystal	61C60189A01	
Knob	36C6019A01	Tuning, Volume, Tone, Selector
Knob	36B60167A06	AFC, Model B3E
Knob	36B60167A03	AFC, Model B3W
Cabinet	1V60030A55	White, Model B3W (Includes Dial Scale)
Cabinet	1V60030A56	Smoke, Model B3E (Includes Dial Scale)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

PHOTOFACT® Folder with CIRCUITRACE®

NORELCO MODELS L3X95T/00E, L3X95T/00S, L3X95T/00W, L3X95T/00X

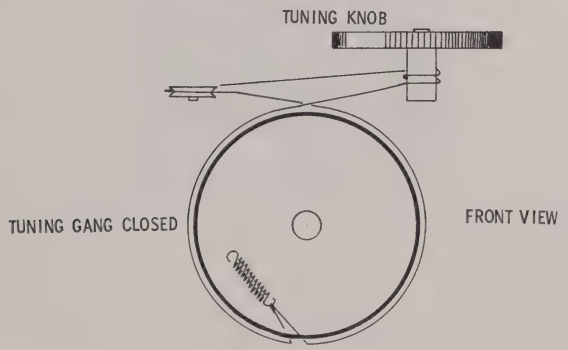
NORELCO MODELS L3X95T/00E, L3X95T/00S, L3X95T/00W, L3X95T/00X

MODEL L3X95T/00W

NORELCO MODELS L3X95T/00E, L3X95T/00S, L3X95T/00W, L3X95T/00X

TRADE NAME	Norelco Models L3X95T/00E, L3X95T/00S, L3X95T/00W, L3X95T/00X		
SUPPLIER	North American Philips Co., Inc., 100 E. 42nd Street, New York 17, N. Y.		
TYPE SET	Battery Operated Transistorized Portable BC-SW Receiver		
POWER SUPPLY	6 Volts DC	RATING	15MA @ 6 Volts DC (No Signal, Min. Volume) 25MA @ 6 Volts DC (Signal, Normal Volume)
TUNING RANGE — BROADCAST	517 — 1622KC	SHORT WAVE 5.9 — 18.1MC	MARINE BAND 1.6 — 5.2MC

DRIVE CORD STRINGING



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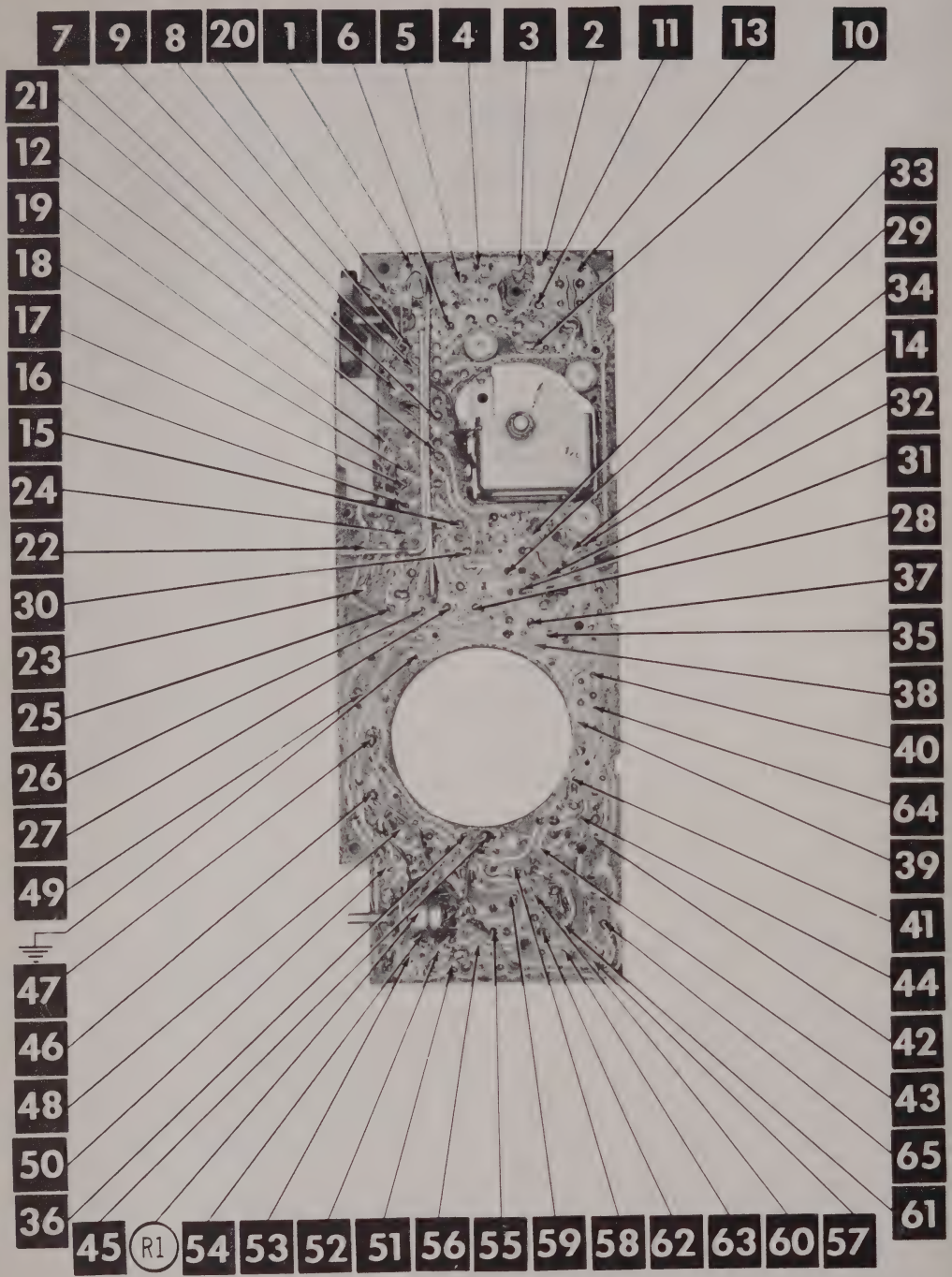
SET 541 FOLDER 14



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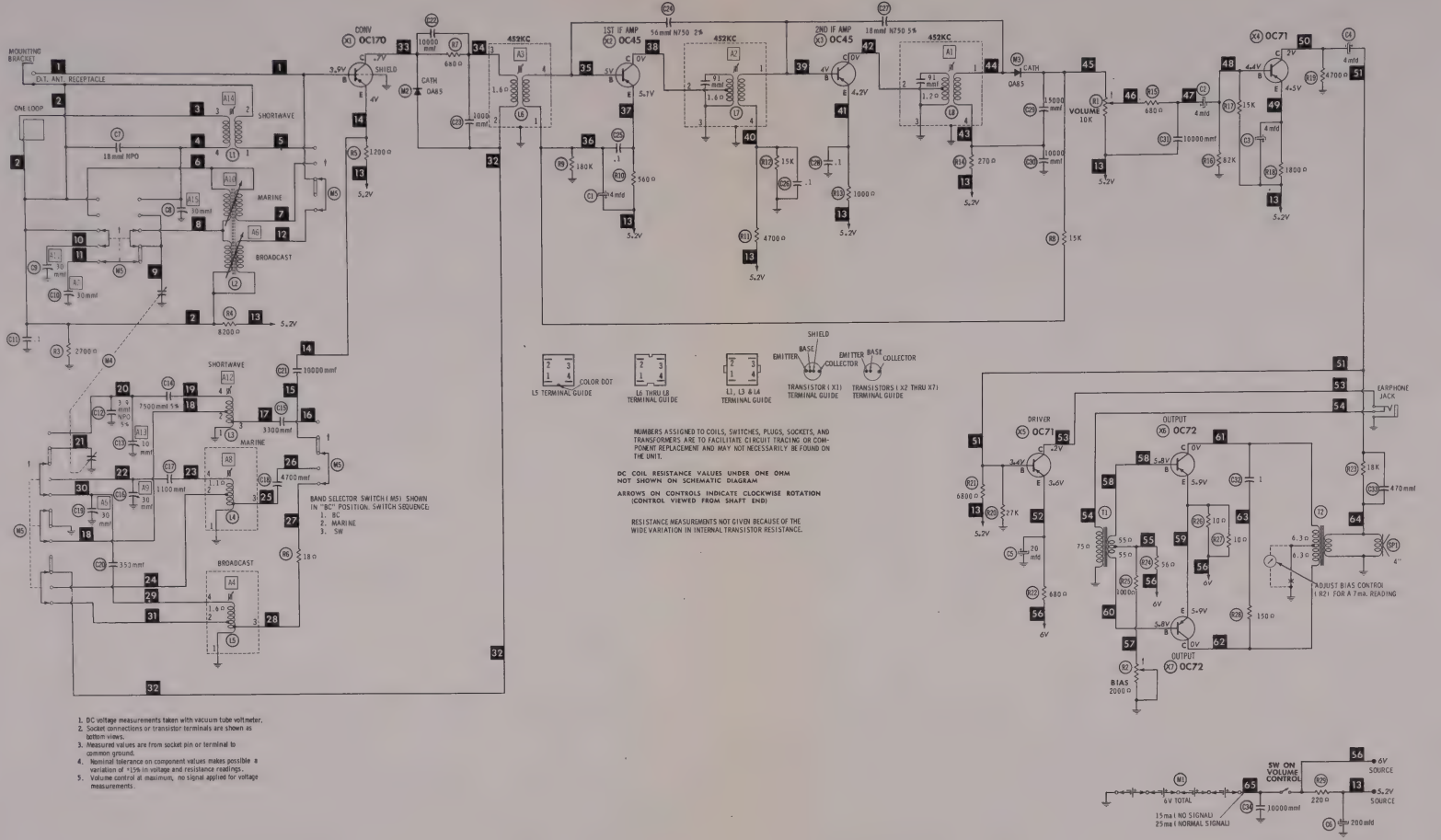
PRINTED BOARD



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE
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NORELCO MODELS L3X95T/00E, L3X95T/00S, L3X95T/00W, L3X95T/00X

CHASSIS TOP VIEW-CAPACITOR & RESISTOR IDENT.

NORELCO MODELS L3X95T/00E,
L3X95T/00S, L3X95T/00W, L3X95T/00X

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A8, A12.....GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A14.....GENERAL CEMENT #8607, 9291, 9294
WALSCO #2520, 2522, 2523, 2524, 2534, 2537

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru 100K to Collector of Converter. Low side to chassis.	452KC (400Ω 30% AM)	(BC) Tuning gang fully open.	Across voice coil.	A1, A2, A3	Adjust for maximum output.
2.	Loop	512KC	Tuning gang fully closed.	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	1635KC	Tuning gang fully open.	"	A5	"
4.	"	550KC	550KC Signal.	"	A6	"
5.	"	1500KC	1500KC Signal.	"	A7	"
6.	"	1.61MC	(SW3) Tuning gang fully closed.	"	A8	"
7.	"	5.25MC	Tuning gang fully open.	"	A9	"
8.	"	1.74MC	1.74MC Signal.	"	A10	"
9.	"	4.8MC	4.8MC Signal.	"	A11	"
10.	"	5.85MC	(SW2) Tuning gang fully closed.	"	A12	"
11.	"	18.2MC	Tuning gang fully open.	"	A13	"
12.	"	6.35MC	6.35MC Signal.	"	A14	"
13.	"	16.9MC	16.9MC Signal.	"	A15	Adjust for maximum output. Repeat Steps 2 thru 13.

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	OC170	Converter				PNP
X2	OC45	1st IF Amplifier		2N483	2N410	PNP
X3	OC45	2nd IF Amplifier		2N483	2N410	PNP
X4	OC71	AF Amplifier	2N406	2N362	2N406	PNP
X5	OC71	Driver	2N406	2N362	2N406	PNP
X6	OC72	Output	2N408	2N632	2N408	PNP
X7	OC72	Output	2N408	2N632	2N408	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	NORELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	4	64	909/Z4	PTT-10005	NLW4-15	TT50X4	MLV5-12	TE-1123	
C2	4	64	909/Z4	PTT-10005	NLW4-15	TT50X4	MLV5-12	TE-1123	
C3	4	64	909/Z4	PTT-10005	NLW4-15	TT50X4	MLV5-12	TE-1123	
C4	4	64	909/Z4	PTT-10005	NLW4-15	TT50X4	MLV5-12	TE-1123	
C5	20	6.4	C426AM/C20	PTT-10020	NLW20-15	TT15X20	MLV20-12	TE-1130	
C6	200	6.4	909/W200	PTT-6200	NLW200-12		MLV200-12	TE-1119.6	

FIXED CAPACITORS

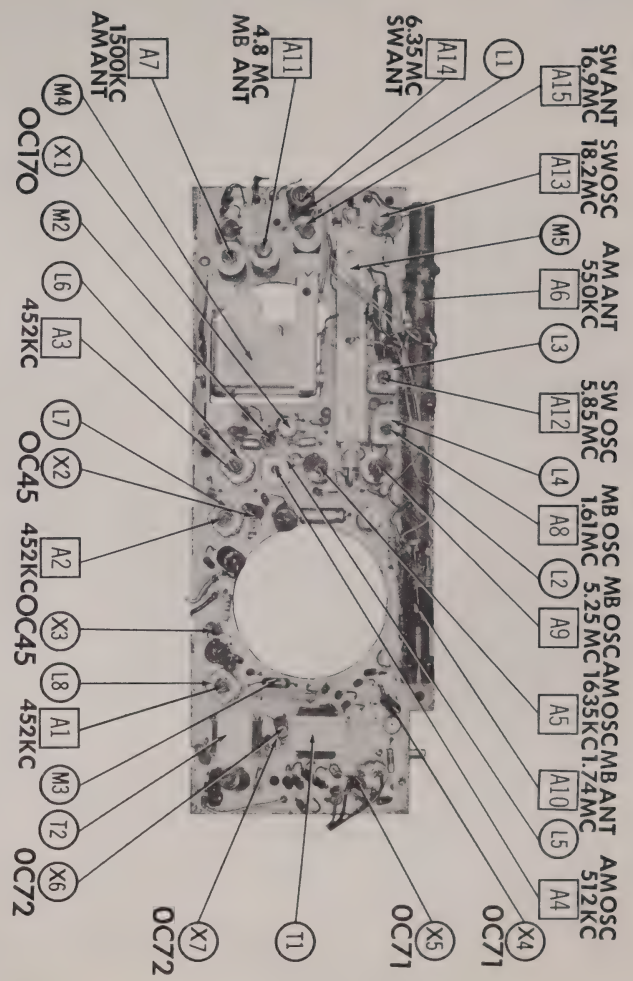
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA						
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	18 NPO		NPO-SI 18	TCZ-18	C10Q18C	CCTO-180	CNO-418	10TCC-Q18	
C8	30								
C9	30								
C10	30								
C11	.1 125V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10	
C12	3.9 NPO 5%				C10V4C			10TCC-V39	
C13	10								
C14	7500 5%				10R5D75	CM-35B-752J		MS-275	
C15	3300		SI 3300	D6-332	BYA10D33	CCD-332	B-233	5HK-D33	
C16	30								
C17	1100		SI 1200	D6-122	L10D12	CCD-122	B-212	10TS-D12	
C18	4700		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47	
C19	30								
C20	350		SI 360		L10T35		GP335	10TS-T35	
C21	10000		SI 10000	D6-103	BYA10S1	CCD-103	B-110	5HK-S10	
C22	10000		SI 10000	D6-103	BYA10S1	CCD-103	B-110	5HK-S10	
C23	1000		SI 1000	D6-102	BYA10D1	CCD-102	B-210	5HK-D10	
C24	56 N750 2%			TCN-56					
C25	.1 125V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10	
C26	.1 125V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10	
C27	18 N750 5%			TCN-18	C10Q18U		CN7-418	10TCU-Q18	
C28	.1 125V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10	
C29	15000		SI 15000	DD-153	BYA10S15	CCD-153	B-115	5HK-S15	
C30	10000		SI 10000	D6-103	BYA10S1	CCD-103	B-110	5HK-S10	
C31	10000		SI 10000	D6-103	BYA10S1	CCD-103	B-110	5HK-S10	
C32	.1 125V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10	
C33	470		SI 470	D6-471	BYA10T47	CCD-471	B-347	10TS-T47	
C34	10000		SI 10000	D6-103	BYA10S1	CCD-103	B-110	5HK-S10	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	NORELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	10K	1/4	B151485					Volume
B	Switch							Power Off-On
R2	2000Ω	1/4	B151454					Bias

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R3	2700Ω			
R4	8200Ω			
R5	1200Ω			
R6	18Ω			
R7	680Ω			
R8	15K			
R9	180K			
R10	560Ω			
R11	4700Ω			
R12	15K			
R13	1000Ω			
R14	270Ω			
R15	680Ω			
R16	82K			

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R17	15K			
R18	1800Ω			
R19	4700Ω			
R20	27K			
R21	6800Ω			
R22	680Ω			
R23	18K			
R24	56Ω			
R25	1000Ω			
R26	10Ω			
R27	10Ω			
R28	150Ω			
R29	220Ω			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA NORELCO PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	NOTES
L1	Sw. Ant.	A398609					
L2A	Marine Loopstick	A398601					
B	BC Loopstick						
L3	Sw. Osc.	A312981					
L4	Marine Osc.	A312982					
L5	BC Osc.	A312980					
L6	1st IF	A312983					
L7	2nd IF	A312960					
L8	3rd IF	A312961					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO PRI.	TURNS RATIO SEC.	REPLACEMENT DATA NORELCO PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	1	1	A316221					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA NORELCO PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	100Ω CT	3-4Ω	A315424		TA-39 ①			① Remove frame

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA NORELCO PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	AD3414Z	4A05 *	* Trim mounting bracket to fit.

BATTERIES

ITEM No.	VOLTAGE	NORELCO PART No.	REPLACEMENT DATA BURGESS "A"	BURGESS "B"	EVEREADY "A"	EVEREADY "B"	MALLORY "A"	MALLORY "B"	NOTES
M1	1.5V	*		230 *		A100 *		M-13R*	* 4 Required

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA NORELCO PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M2	OA85			1N60	1N60	Overload (Pigtail)
M3	OA85			1N60	1N60	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	NORELCO PART No.	NOTES
M4	Tuning Cap.	4900246	2 Gang
M5	Switch		Band Selector (Slider Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	A378413	Volume
Knob	P407809/417/AA	Tuning, Model L3X95T/00S
Knob	P407809/417/UB	Tuning, Models L3X95T/00W, L3X95T/00E, L3X95T/00X
Knob	P541166/423/HA	Selector, Model L3X95T/00S
Knob	P541166/423/FY	Selector, Models L3X95T/00W, L3X95T/00E, L3X95T/00X
Cabinet	A396107	Green, Model L3X95T/00S
Cabinet	A396115	Blue, Model L3X95T/00X
Cabinet	A396120	Yellow, Model L3X95T/00E
Cabinet	A396121	Orange, Model L3X95T/00W
Handle	A367331	Model L3X95T/00S
Handle	A367337	Models L3X95T/00X, L3X95T/00E, L3X95T/00W

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

PHOTOFACT® Folder with CIRCUITRACE®

SONY
MODEL TR-714

SONY
MODEL TR-714

TRADE NAME	Sony Model TR-714
IMPORTER	Sony Corp. of America, 514 Broadway, New York 12, N. Y.
TYPE SET	Battery Operated Transistorized Portable BC-SW Receiver
POWER SUPPLY	9 Volts DC
RATING	7MA @ 9 Volts DC (No Signal, Min. Volume)
	20MA @ 9 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	535 — 1605KC
SHORT WAVE	3.9 — 12MC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3, ... GENERAL CEMENT #8607, 9291, 9294
WALSCO #2520, 2522, 2523, 2524, 2534, 2537
A4, A8, A10..... GENERAL CEMENT #9440
A5, A7, A9, A11..... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400~ Mod.)	(BC) Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	520KC	Tuning gang fully closed.	"	A4	"
3.	"	1680KC	Tuning gang fully open.	"	A5	"
4.	"	640KC	640KC Signal.	"	A6	"
5.	"	1400KC	1400KC Signal.	"	A7	"
6.	"	3.82MC	(SW) Tuning gang fully closed.	"	A8	"
7.	"	12.8MC	Tuning gang fully open.	"	A9	"
8.	"	4MC	4MC Signal.	"	A10	"
9.	"	12MC	12MC Signal.	"	A11	Adjust for maximum output. Repeat Steps 2 thru 9.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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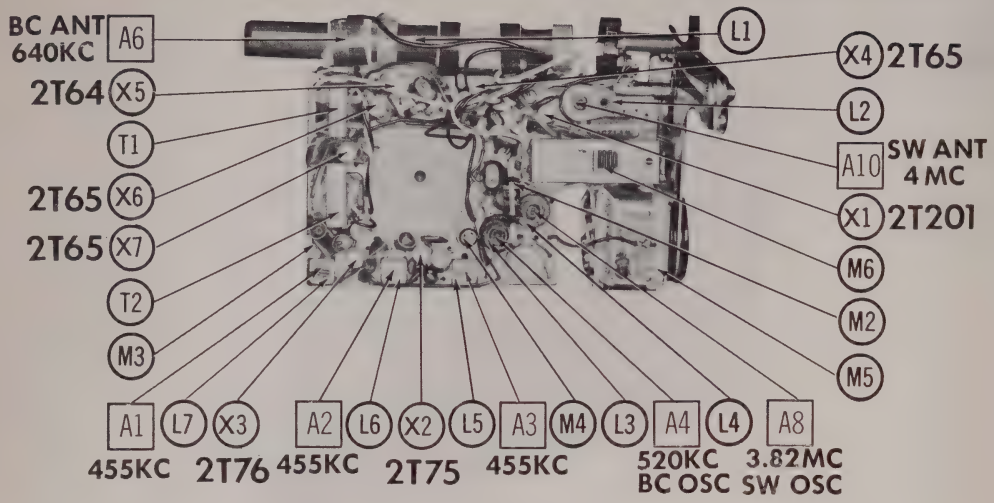
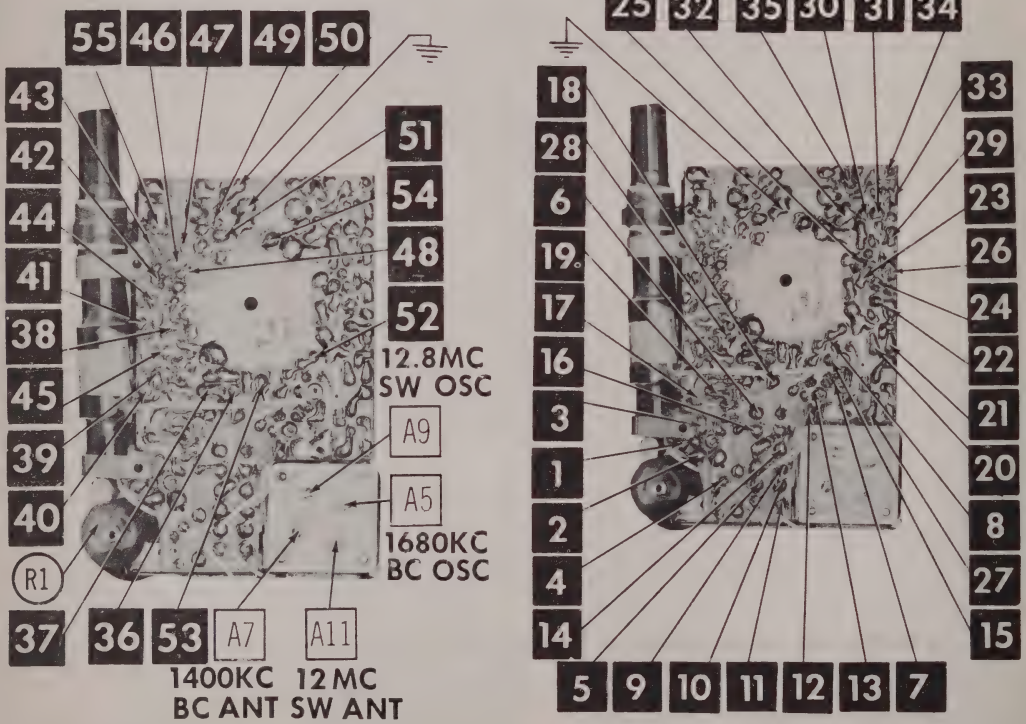
SET 541 FOLDER 15



CHASSIS TOP VIEW



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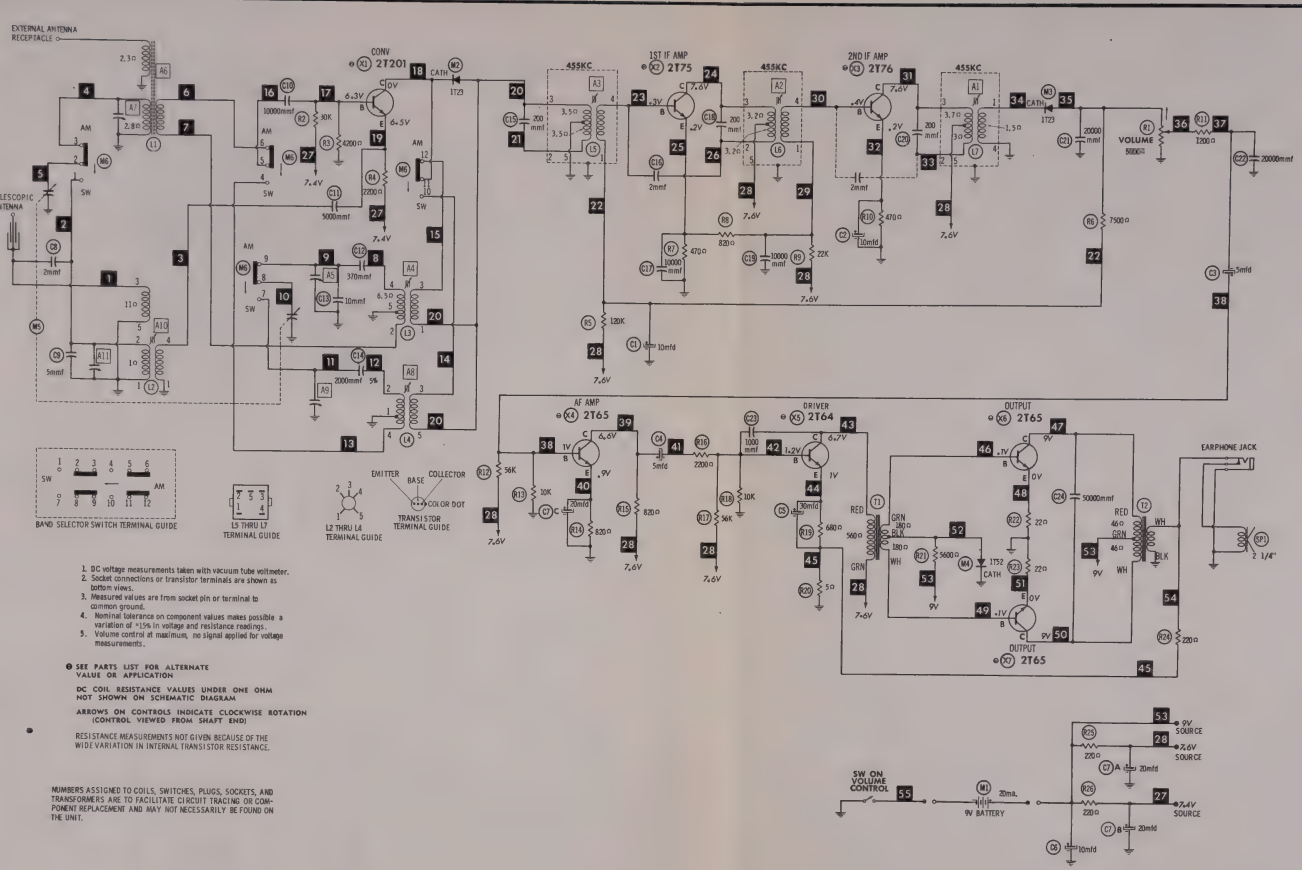

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

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SONY MODEL TR-714

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2T201	Converter				PNP
	2SA122*	Converter				
X2	2T75	1st IF Amplifier				NPN
	2T76*	1st IF Amplifier				
	2SC76*	1st IF Amplifier				
X3	2T76	2nd IF Amplifier				NPN
	2SC76*	2nd IF Amplifier				
X4	2T65	AF Amplifier			2N214	NPN
	2T66*	AF Amplifier				
	2SD66 *	AF Amplifier				
X5	2T64	Driver				NPN
	2T65 *	Driver				
	2SD65*	Driver				
X6	2T65	Output			2N214	NPN
	2SD65 *	Output				
X7	2T65	Output			2N214	NPN
	2SD65*	Output				

* Alternate Type.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	SONY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	10	3			NLW10-6	TT3X10	ML10-3		
C2	10	3			NLW10-6	TT3X10	ML10-3		
C3	5	6			NLW5-15	TT6X5	ML5-6		
C4	5	6			NLW5-15	TT6X5	ML5-6		
C5	30	3			NLW30-6	TT3X25	ML30-6		
C6	10	10			NLW10-15	TT12X10	ML10-10		
C7A	20	10							
B	20	10							
C	20	10							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA						NOTES
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.	
C8	2		NPO-DI 2.2	DTZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22	
C9	5		NPO-SI 5.0	TCZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50	
C10	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10	
C11	5000		C80V502AM	DD-502	H-05D5	CCD-502	TA-250	TG-D50	
C12	370		DI-390	DD-391	L10T39	CCD-391	GP339	10TS-T39	
C13	10		NPO-SI 10	TCZ-10	C10Q1C		CNO-410	10TCC-Q10	
C14	2000 5%				5R5D2	CM-19B-202J			
C15	200		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T20	
C16	2		NPO-DI 2.2	DTZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22	

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C17	10000		C80V103AM	DA-103	H-05S1		TA-110	TG-S10
C18	200		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T20
C19	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C20	200		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T20
C21	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C22	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C23	1000		C80V102AM	DD-102	H-05D1	CCD-102	B-210	5HK-D10
C24	50000		C80V503AM	DA-503	H-05S5		TA-150	TG-S50

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SONY PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/10						Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	30K				R15	820Ω			
R3	4200Ω				R16	2200Ω			
R4	2200Ω				R17	56K			
R5	120K				R18	10K			
R6	7500Ω				R19	680Ω			
R7	470Ω				R20	5.0Ω			
R8	820Ω				R21	5600Ω			
R9	22K				R22	22Ω			
R10	470Ω				R23	22Ω			
R11	1200Ω				R24	220Ω			
R12	56K				R25	220Ω			
R13	10K				R26	220Ω			
R14	820Ω								

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		SONY PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	Loopstick	LA-035-1Q					
L2	SW Ant.	LA-034-1Q					
L3	BC Osc.	LO-026-AQ					
L4	SW Osc.	LO-027-AQ					
L5	1st IF	LI-021-AR					
L6	2nd IF	LI-021-BR					
L7	3rd IF	LI-021-CR					

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	SONY PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.4	1	TI-002-04					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	SONY PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	2000Ω CT	6-8Ω	TX-002-04					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SONY PART No.	QUAM PART No.	
SP1	2 1/4"	PM	6-8Ω	P-224 SA		

BATTERIES

ITEM No.	VOLTAGE	SONY PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	BL-006P		2U6		216		M-1604	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		SONY PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1T23G			1N60	1N60	Overload (Pigtail)
M3	1T23G			1N60	1N60	Detector (Pigtail)
M4	1T52					Bias Regulator (Pigtail)

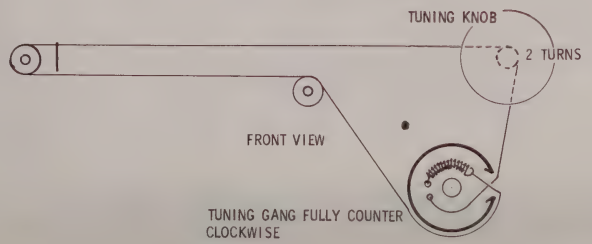
MISCELLANEOUS

ITEM No.	PART NAME	SONY PART No.	NOTES
M5	Tuning Cap.	PVC-2JT	2 Gang
M6	Switch		Band Selector (Slide Type)

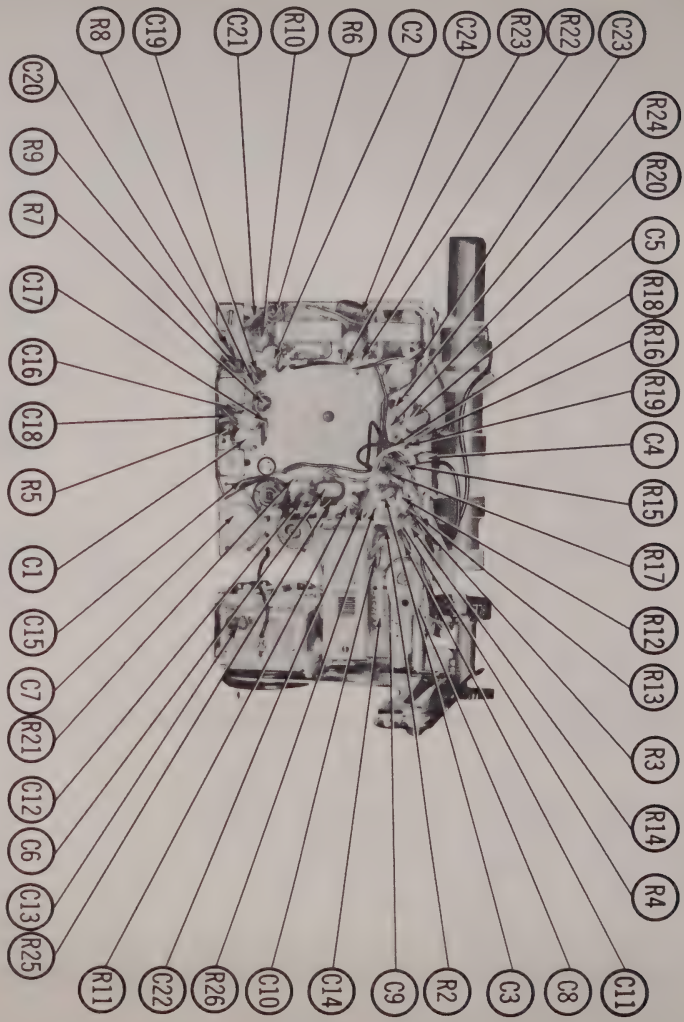
WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

DIAL CORD STRINGING



CHASSIS—TOP VIEW



PHOTOFACT® Folder

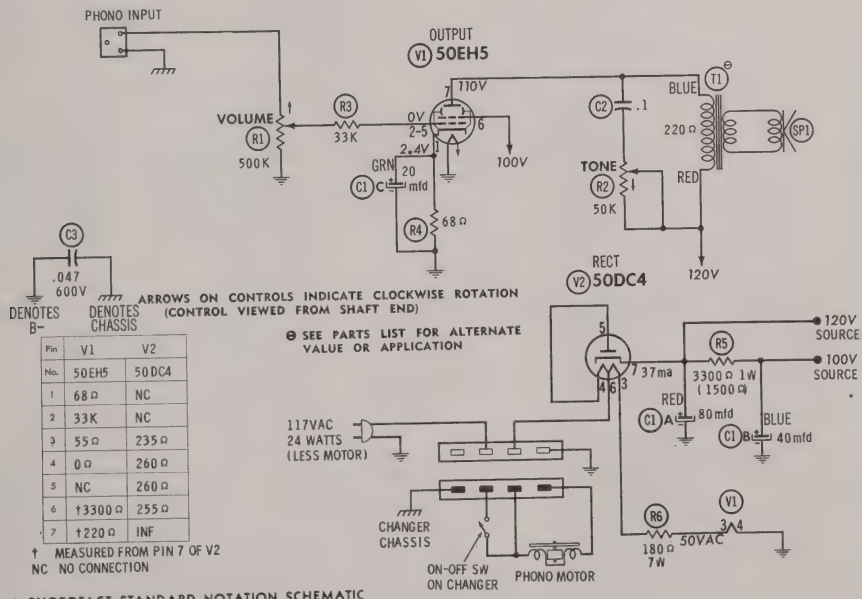
WESTINGHOUSE
MODELS H-63AC1, H-63AC2

WESTINGHOUSE
MODELS H-63AC1, H-63AC2

MODEL H-63AC2

TRADE NAME	Westinghouse Models H-63AC1, H-63AC2
MANUFACTURER	Westinghouse Electric Corp., Radio – Television Div., Metuchen, N. J.
TYPE SET	AC Operated 2 Tube Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110 – 120 Volts AC, 60 Cycles RATING 24 Watts, .22 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER PART #671V008H04 – SEE MONARCH UA12 – PHOTOFACT SET 465 FOLDER 6 OR RECORD CHANGER MANUAL



Pin No.	V1	V2
1	68Ω	NC
2	33K	NC
3	55Ω	235Ω
4	0Ω	260Ω
5	NC	260Ω
6	†3300Ω	255Ω
7	†220Ω	INF

† MEASURED FROM PIN 7 OF V2
NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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KS528

DATE 8 – 61 SET 541 FOLDER 16

SET 541 FOLDER 16

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	GENERAL ELECTRIC / RAYTHEON / SYLVANIA — USE	TYPE
V1	Output	50EH5
V2	Rectifier	50DC4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	80	150	218V025H46	PRS3800	BBRT84215	TCT3117	TDLT-7	TVA-3455	
B	40	150							
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C3	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	270V063H01	B-59	A47-500K-S	Q11-133	U50	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	50K	½	270V076H02	B-32	A47-50K-Z	Q13-123	U33	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R3	33K			
R4	68Ω			

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R5	3300Ω 1W			
R6	180Ω 7W	PW10-180	5W-SQ-180	(1500) *

* Alternate Value.

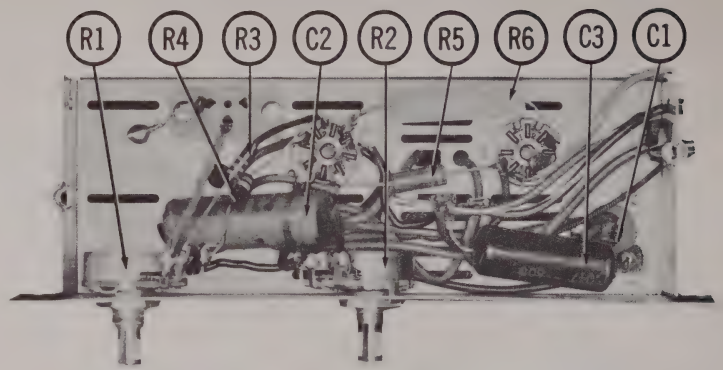
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Westinghouse PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2800Ω	3-4Ω	430V085H01 ①	A-3025	A-3332	24S53	S-12X	① Alternate Part #430V084H01

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA Westinghouse PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	570V059H01	4A07	

CHASSIS—BOTTOM VIEW



PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	REPLACEMENT DATA Westinghouse PART No. CARTRIDGE	Westinghouse NEEDLE*	ASTATIC PART No. CARTRIDGE	ASTATIC NEEDLE*	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE NEEDLE*	SONOTONE PART No. CARTRIDGE	SONOTONE NEEDLE*	NOTES
M1	690V018H62	* ① * ②	420-TS-T1	N8-1* & N8-3 *	AB2	Not Req.	12TH-S	Not Req.	①LP (Part #690V018H63) ②78 (Part #690V018H64)

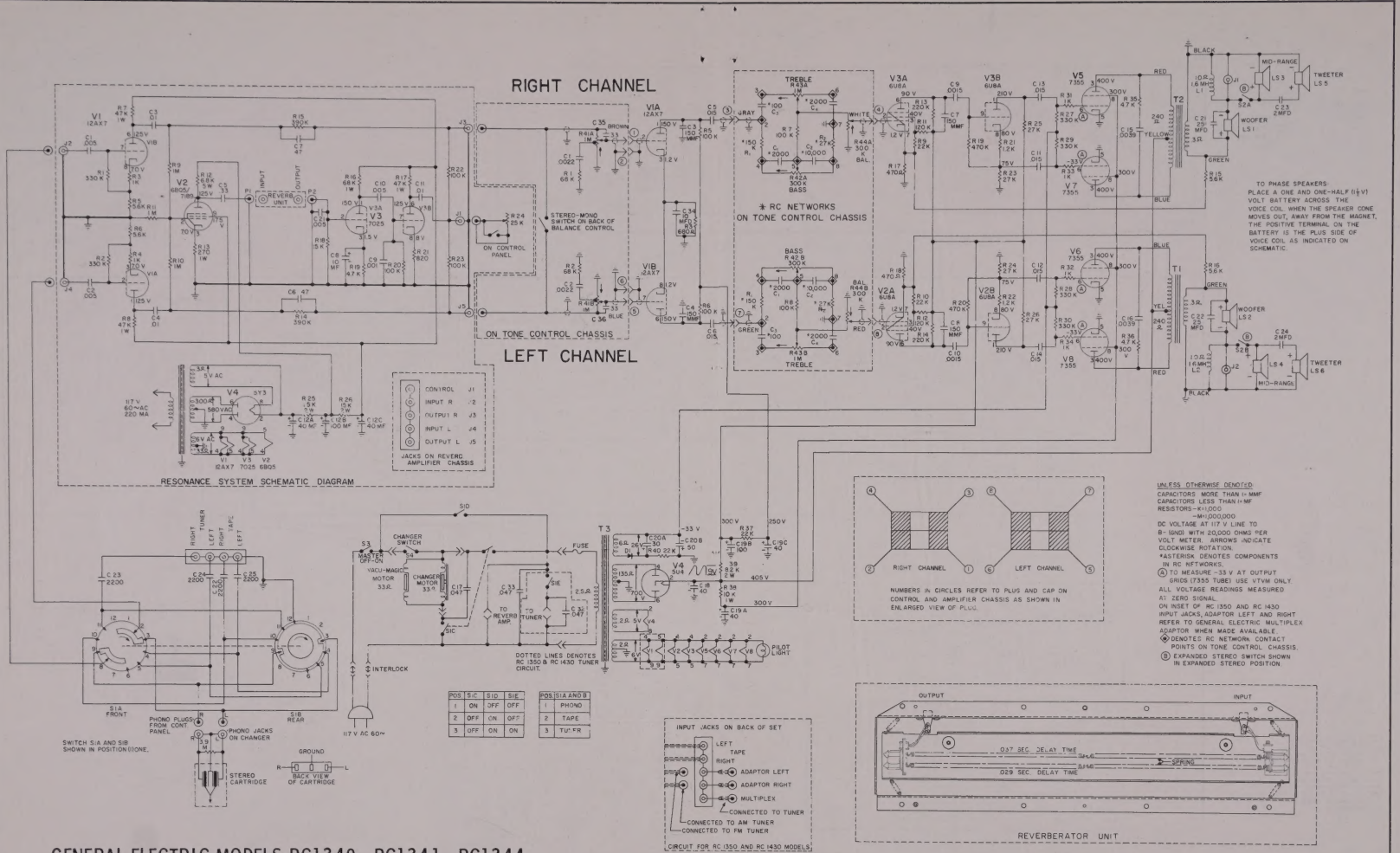
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	550V108H01	Volume
Knob	550V108H04	Tone
Cabinet Ass'y.	516V232H01	Model H-63AC1
Cabinet Ass'y.	516V232H02	Model H-63AC2

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

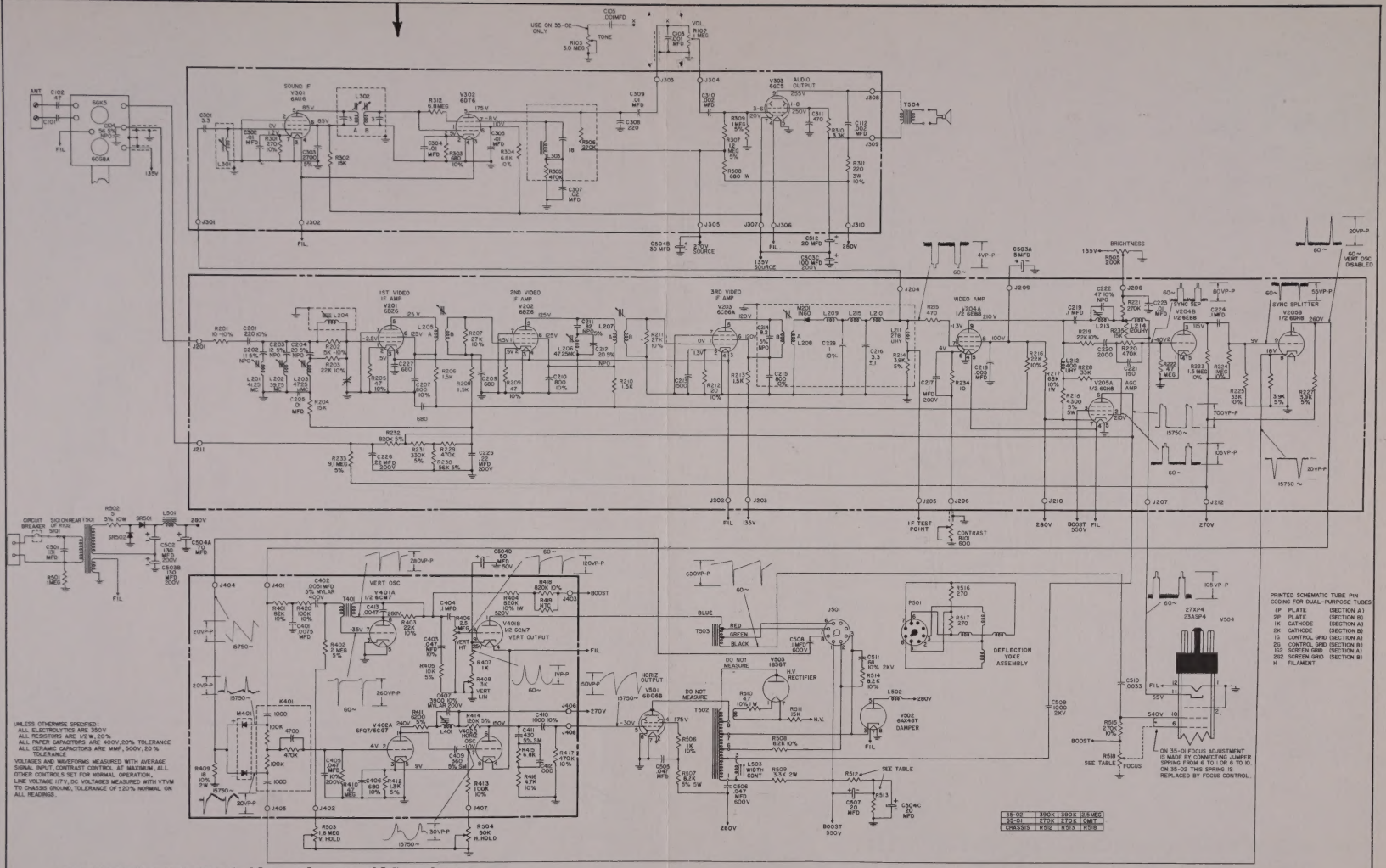

RIGHT CHANNEL
LEFT CHANNEL
RESONANCE SYSTEM SCHEMATIC DIAGRAM
ON TONE CONTROL CHASSIS
* RC NETWORKS ON TONE CONTROL CHASSIS
STEREO-MONO SWITCH ON BACK OF BALANCE CONTROL
ON CONTROL PANEL
TO PHASE SPEAKERS: PLACE A ONE AND ONE-HALF (1½ V) VOLT BATTERY ACROSS THE VOICE COIL. WHEN THE SPEAKER CONE MOVES OUT, AWAY FROM THE MAGNET, THE POSITIVE TERMINAL ON THE BATTERY IS THE PLUS SIDE OF VOICE COIL AS INDICATED ON SCHEMATIC.
JACKS ON REVERB. AMPLIFIER CHASSIS
CONTROL J1
INPUT R J2
OUTPUT R J3
INPUT L J4
OUTPUT L J5
RIGHT CHANNEL
LEFT CHANNEL
NUMBERS IN CIRCLES REFER TO PLUG AND CAP ON CONTROL AND AMPLIFIER CHASSIS AS SHOWN IN ENLARGED VIEW OF PLUG.
UNLESS OTHERWISE DENOTED:
CAPACITORS MORE THAN 1 MMF
CAPACITORS LESS THAN 1 MF
RESISTORS - K = 1,000
M = 1,000,000
DC VOLTAGE AT 117 V LINE TO B- (GND) WITH 20,000 OHMS PER VOLT METER. ARROWS INDICATE CLOCKWISE ROTATION.
*ASTERISK DENOTES COMPONENTS IN RC NETWORKS.
A TO MEASURE -33 V AT OUTPUT GRIDS (7355 TUBE) USE VTVM ONLY. ALL VOLTAGE READINGS MEASURED AT ZERO SIGNAL.
ON INSET OF RC 1350 AND RC 1430 INPUT JACKS, ADAPTOR LEFT AND RIGHT REFER TO GENERAL ELECTRIC MULTIPLEX ADAPTOR WHEN MADE AVAILABLE.
◆ DENOTES RC NETWORK CONTACT POINTS ON TONE CONTROL CHASSIS.
B EXPANDED STEREO SWITCH SHOWN IN EXPANDED STEREO POSITION.
SWITCH S1A AND S1B SHOWN IN POSITION (1) ONE.
S1A FRONT
S1B REAR
PHONO PLUGS FROM CONT. PANEL
PHONO JACKS ON CHANGER
STEREO CARTRIDGE
BACK VIEW OF CARTRIDGE
GROUND
117 V AC 60~
INTERLOCK
DOTTED LINES DENOTES RC 1350 & RC 1430 TUNER CIRCUIT
TO REVERB AMP
TO TUNER
PILOT LIGHT
CHANGER SWITCH
MASTER OFF-ON
VACU-MAGIC MOTOR 33⅓
CHANGER MOTOR 33⅓
POS. S1C S1D S1E
1 ON OFF OFF
2 OFF ON OFF
3 OFF ON ON
POS. S1A AND B
1 PHONO
2 TAPE
3 TUNER
INPUT JACKS ON BACK OF SET
LEFT
TAPE
RIGHT
ADAPTOR LEFT
ADAPTOR RIGHT
MULTIPLEX
CONNECTED TO TUNER
CONNECTED TO AM TUNER
CONNECTED TO FM TUNER
CIRCUIT FOR RC 1350 AND RC 1430 MODELS
OUTPUT
INPUT
.037 SEC. DELAY TIME
.029 SEC. DELAY TIME
SPRING
REVERBERATOR UNIT
MID-RANGE
TWEETER LS 5
WOOFER LS 1
WOOFER LS 2
TWEETER LS 6
MID-RANGE

GENERAL ELECTRIC MODELS RC1340, RC1341, RC1344, RC1350, RC1351, RC1354, RC1430, RC1431, RC1434

Schematic Diagram Courtesy of General Electric Company

← GENERAL ELECTRIC

MAGNAVOX



MAGNAVOX CHASSIS C35-01-00, C35-02-00,
U35-01-00, U35-02-00, V35-01-00, V35-02-00

Schematic Diagram Courtesy of The Magnavox Company

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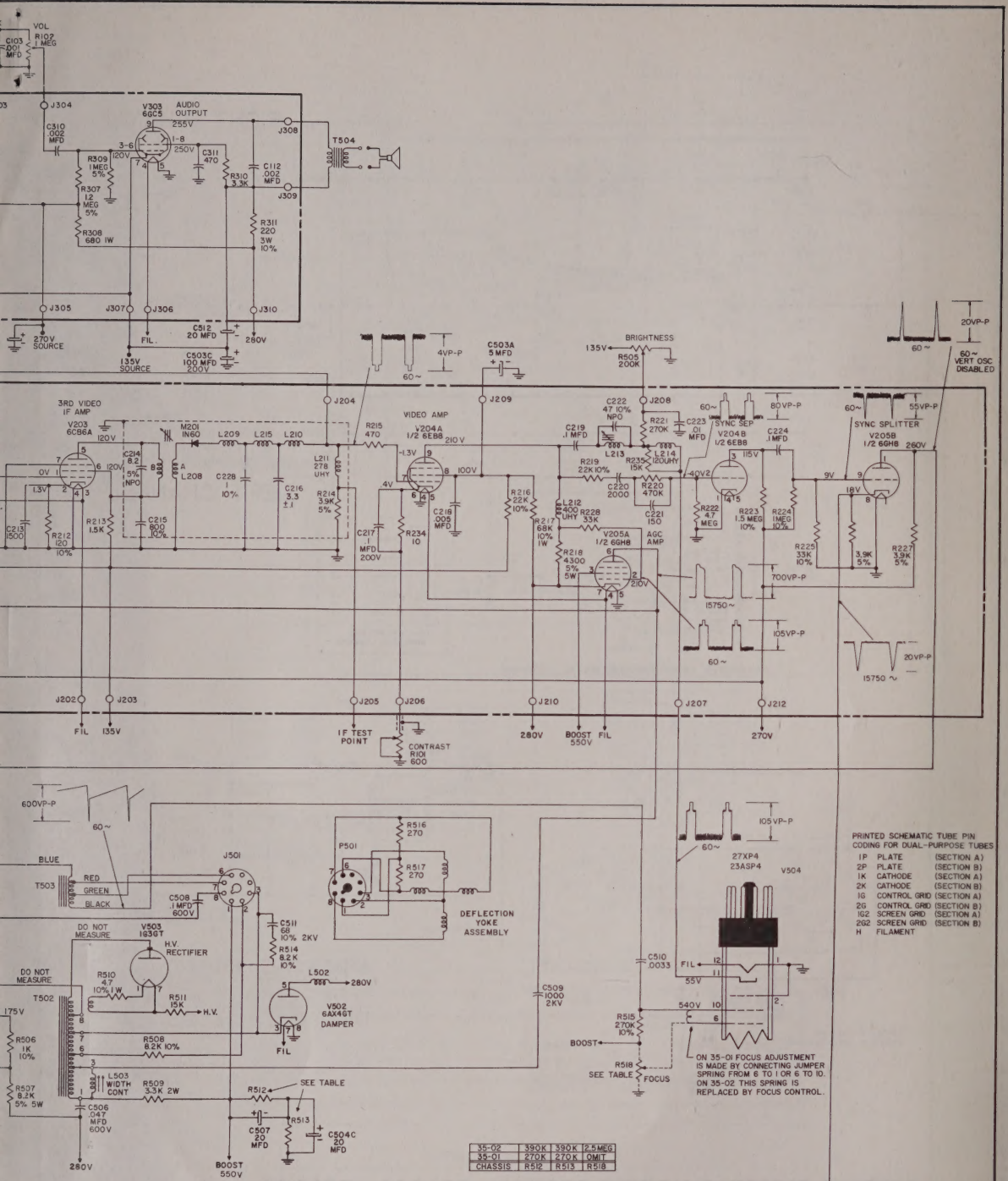
SET 541 FOLDER 17-S



Schematic Diagram Courtesy of The Magnavox Company